NATURE MAGAZINE

OCTOBER 1925

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NATURE MAGAZINE

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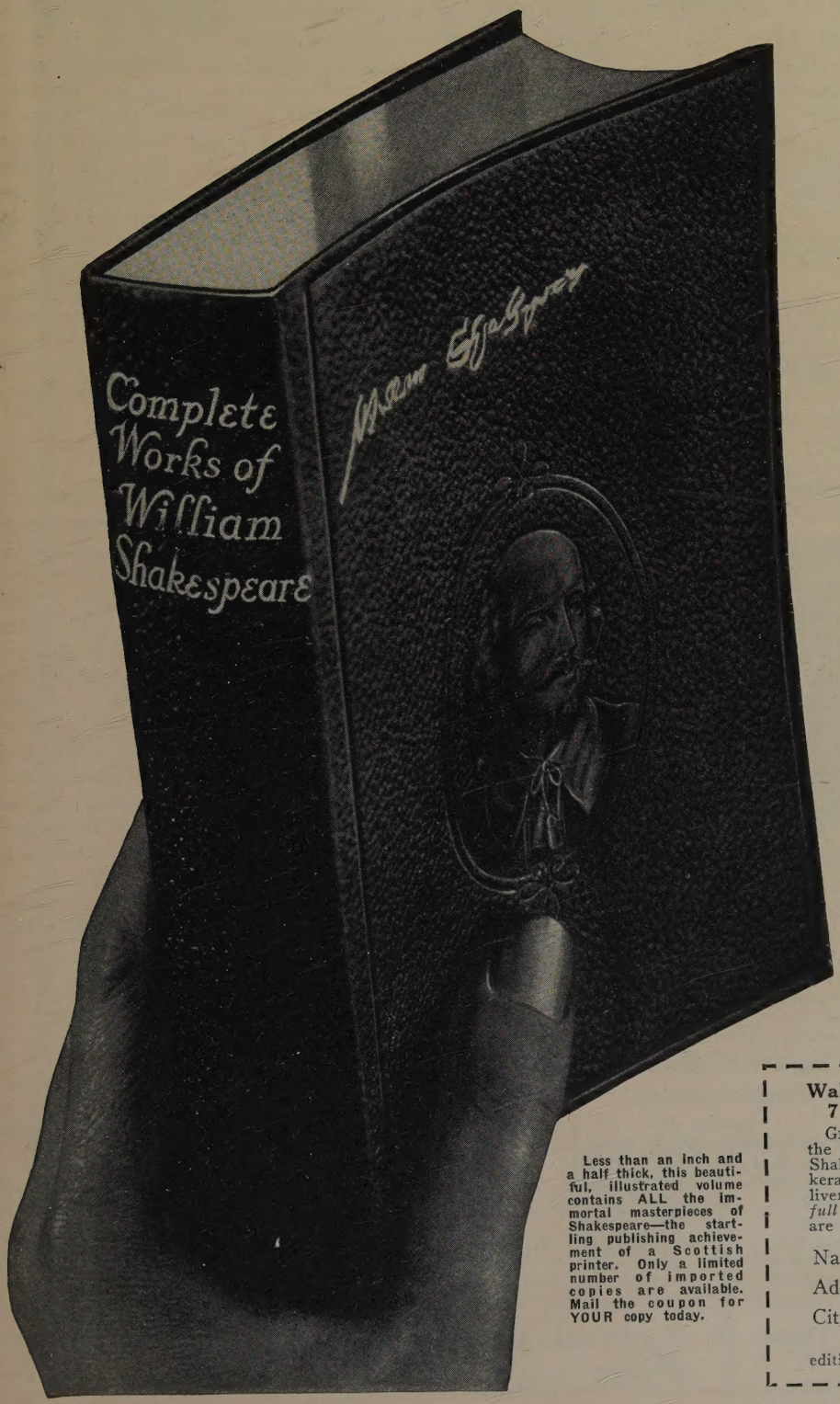

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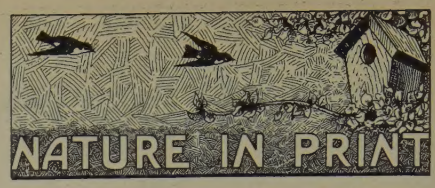

The Arnold Arboretum

It would be impossible to tell the story of the Arnold Arboretum in a volume of 118 pages. E. H. Wilson has not attempted to do this in his book, "America's Greatest Garden," published by the Stratford Company of Boston. Instead he has elected to take the reader through the beautiful pathways of this wonder park in various rambles which give an attractive picture of the reservation. The first chapter is historical, a tribute alike to the vision of James Arnold, New Bedford merchant, who first made the Arboretum possible through his will, and to Charles Sprague Sargent, whose directorship of half a century has been a notable achievement. The remainder of the book takes the reader here and there in the Arboretum. It is entertainingly and simply written. It attains what the author seeks to attain—to extend an invitation to those who have not yet visited the Arboretum to come and enjoy it.

Insect Life

Teachers and nature lovers who have been appalled by the technicalities of the average textbook of entomology and unsatisfied by the limited application of many popular books of insect stories, should welcome "Insect Life," the new insect merit badge manual of the Boy Scouts of America. This book first appeared in print in June. It is a handy booklet of some two hundred pages written by men experienced in scientific work and in working with boys. "The book, while meeting the most exacting demands of the teacher or student, constantly intrigues the interest through the humerous marginal gloss, the number and variety of the illustrations, and the style of the text, manages to sustain a delightful informality absent from most scientific books."

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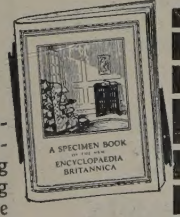

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Our Greatest Mountain

In "Our Greatest Mountain," published by G. P. Putnam's Sons, F. W. Schmoe, Park Naturalist, has written a handbook of Mount Rainier National Park which is well-nigh perfect in its planning, and scarcely less so in its building. Well-written accounts, beautifully illustrated, of the physiography, with special consideration of the glaciers, and of the mountain's recent history, are followed by chapters on the life zones, flowers, ferns, forests, mammals, birds and fishes. Credit for assistance from specialists is given in most instances, but mention should have been made of the intensive natural history work done on the mountain in 1919 by the party under Walter P. Taylor and W. T. Shaw, to whose unpublished accounts the chapters on life zones, mammals, and birds are so much indebted.

Trees and How They Serve

Forestry and forest conservation has been made a compulsory subject in the upper elementary grades of the public schools of Tennessee. Accordingly a textbook, "Our Trees and How They Serve Us," has been adopted for this use. The authors of this book are R. S. Maddox, Tennessee State Forester, and Dr. A. E. Parkins, Professor of Geography, George Peabody College. It is published by Charles Scribner's Sons.

Schooling often stops with the grammar grades. We cannot afford to permit, through neglect, uninstructed individuals innocently to waste the forests of our country. The child is our future citizen and the conservation of America's resources must rest with him. This textbook will assist in making him more capable of handling this all-important problem.

WHAT I THINK OF PELMANISM - By Judge Ben B. Lindsey

PELMANISM is a big, vital, significant contribution to the mental life of America. I have the deep conviction that it is going to strike at the very roots of individual failure, for I see in it a new power, a great driving force.

I first heard of Pelmanism while in England on war work. Sooner or later almost every conversation touched on it, for the movement seemed to have the sweep of a religious conviction. Men and women of every class and circumstance were acclaiming it as a new departure in mental training that gave promise of ending that *preventable* inefficiency which acts as a brake on human progress. Even in France I did not escape the word, for thousands of officers and men were *Pelmanizing* in order to fit themselves for return to civil life.

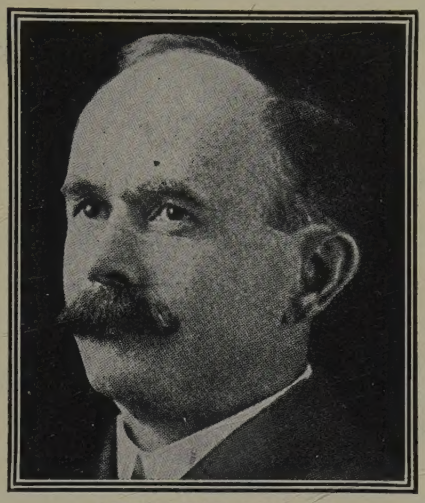
When I learned that Pelmanism had been brought to America, by Americans for Americans, I was among the first to enroll. My reasons were two: first, because I have always felt that every mind needed regular, systematic and scientific exercise, and secondly, because I wanted to find out if Pelmanism was the thing that I could recommend to the hundreds who continually ask my advice in relation to their lives, problems and ambitions.

Failure is a sad word in any language, but it is peculiarly tragic here in America, where institutions and resources join to put success within the reach of every individual. In the twenty years that I have sat on the bench of the Juvenile Court of Denver, almost every variety of human failure has passed before me in melancholy procession. By *failure* I do not mean the merely criminal mistakes of the individual, but the faults of training that keep a life from full development and complete expression.

It is to these needs and these lacks that Pelmanism comes as an answer. The "twelve little gray books" are a remarkable achievement. Not only do they contain the discoveries that science knows about the mind and its workings, but the treatment is so simple that the truths may be grasped by anyone of average education.

In plain words, what Pelmanism has done is to take psychology out of the college and put it into harness for the day's work. It lifts great, helpful truths out of the back water and plants them in the living stream.

As a matter of fact, Pelmanism ought to be the beginning of education instead of a remedy for its faults. First of all, it teaches the science of self-realization; it makes the student *discover* himself; it acquaints him with his sleeping powers and shows him how to develop them. The method is *exercise*, not of the haphazard sort, but a steady, increasing kind that brings each hidden power to full strength without strain or break.



JUDGE BEN B. LINDSEY

Judge Ben B. Lindsey is known throughout the whole civilized world for his work in the Juvenile Court of Denver. He says, "The human mind is *not* an automatic device. It will *not* 'take care of itself.' Will power, originality, decision, resourcefulness, imagination, initiative, courage—these things are not gifts but results. Every one of these qualities can be developed by effort, just as muscles can be developed by exercise."

The human mind is *not* an automatic device. It will *not* "take care of itself." Will power, originality, decision, resourcefulness, imagination, initiative, courage—these things are not gifts, but results. Every one of these qualities can be developed by effort just as muscles can be developed by exercise. I do not mean by this that the individual can add to the brains that God gave him, but he can learn to make use of the brains that he has instead of letting them fall into flabbiness through disuse.

Other methods and systems that I have examined, while realizing the value of mental exercise, have made the mistake of limiting their efforts to the development of some single sense. What Pelmanism does is to consider the mind as a whole and treat it as a whole. It goes in for mental team play, training the mind as a unity. Its big value, however, is the instructional note. Each lesson is accompanied by a work sheet that is really a progress sheet. The student goes forward under a teacher in the sense that he is followed through from first to last, helped, guided and encouraged at every turn by conscientious experts.

Pelmanism is no miracle. It calls for application. But I know of nothing that pays larger returns on an investment of one's spare time from day to day.

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October

Nature Calendar

OCTOBER

"The autumn dandelion
Beside the roadway burns;
Above the lichened boulders
Quiver the plumed ferns.
The cream-white silk of the milkweed
Floats from its sea-green pods,
From out the mossy rock-seams
Flashes the goldenrod."

—*Mary Clemmer Ames.*

Each year one marvels anew at the remarkable beauties of autumn. Nature is then profuse with her colors.

The sugar maple contributes greatly to the brilliant colorings in the forest. It ranges from red to flaming crimson and from yellow to deep orange.

As in early spring, the spice-bush is again a golden spot on the landscape. Its leaves have changed to glowing yellow.

The winter-berry or black alder is scarlet to the tip of its smallest twig. Its brilliant berries remain long after the leaves have fallen.

Woodchucks, all fat and sluggish, are ready to retire for the winter.

Although leaves have been falling during the first two weeks in October and the ground is carpeted with them, the trees still seem well foliaged. Then if there is a frost, wind, heavy rain, or several hot days, the great autumn leaf-fall occurs and the foliage comes showering down as if cut from the trees.

The black walnut is one of the first to drop its leaves.

Butter-and-eggs is indeed a tireless bloomer. From June until now its yellow and orange flowers grace our fields and waste places.

Black oaks are now brownish-red.

You are not likely to find the beautiful orange fruit of the bittersweet along much-traveled highways. The vandalistic automobilist has a habit of stripping the landscape whenever it catches his eye. In a few years there probably will be little bittersweet to enjoy.

Scattered flocks of horned larks from the fur country are now ranging the Atlantic coast.

After the late summer stillness, woods are once more filled with many sounds. The migrating birds twittering and scratching among dried leaves, little fur-bearing animals searching for winter's food supply, the humming of a belated harvest-fly, and even the falling leaves, all add a distinct sound to the autumn day.

Yellow-bellied sapsuckers are here from the north. You must look sharply among the upper branches of the trees if you would see these shy, retiring woodpeckers.

In thickets and shrubbery on the edges of the forest white-throated sparrows are feeding. Often they are in company with juncos and song sparrows.

Brown creepers have joined our bird population.

With the exception of woodpeckers which feed on insect larvae and eggs, most insect-eating birds will have left for the south by the middle of the month.

Male goldfinches now change to somber winter plumage.

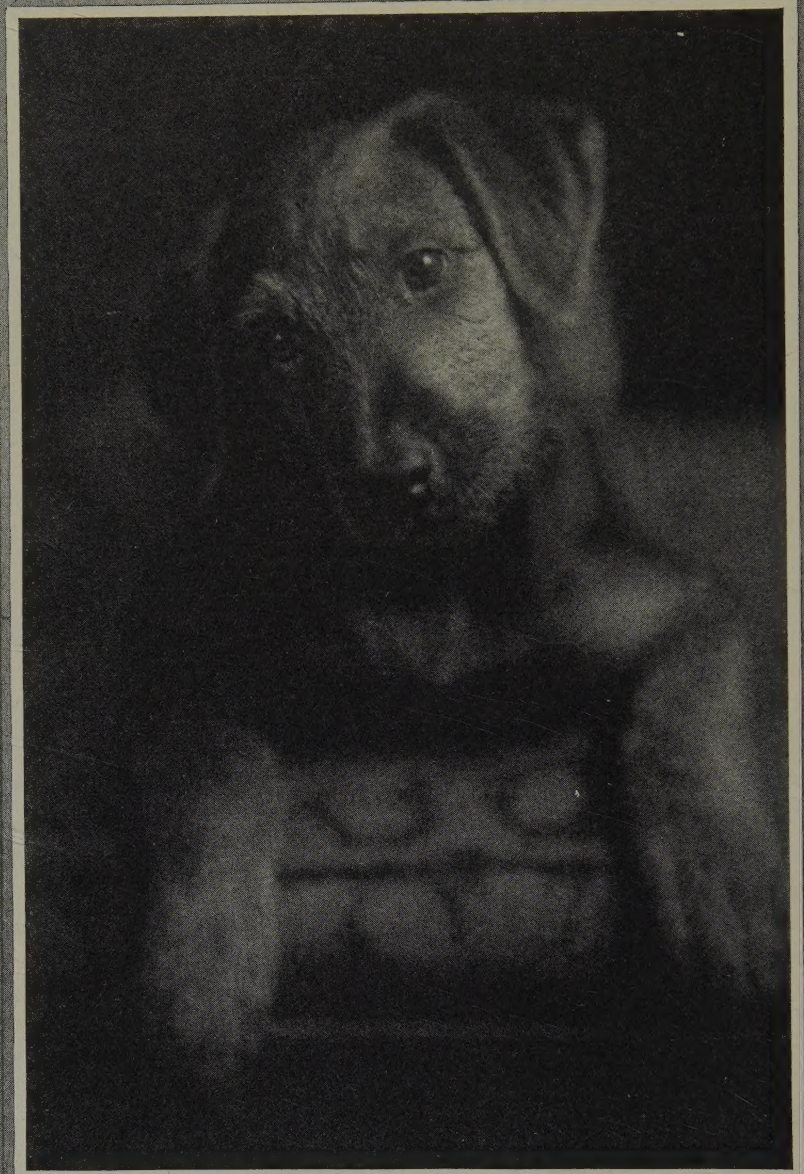
Meadow-larks, white-throated sparrows and song sparrows may still sing for us now and then, but except for call notes, most birds are silent.

The woodpecker drumming for insect larvae on the tree trunk is less conspicuous now that the foliage is so colorful.

You may still hear and see Pickering's tree frogs about the marshes or woods.

Chipmunks are putting away supplies for the winter.

Prepared for NATURE MAGAZINE by the Cleveland Museum of Natural History



"A MAN'S DOG *stands by him in prosperity and in poverty, in health and in sickness. He will sleep on the cold ground, where wintry winds blow and the snow drives fiercely, if only he may be near his master's side. He will kiss the hand that has no food to offer, he will lick the wounds and sores that come in encounters with the roughness of the world. He guards the sleep of his pauper master as if he were a prince. When all other friends desert, he remains.*"—THE LATE SENATOR VEST OF MISSOURI.

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NATURE MAGAZINE

Vol. VI OCTOBER, 1925 No. 4

It seems as if the day was not wholly profane in which we have given heed to some natural object.—EMERSON.

The Airedale Terrier

By ALBERT PAYSON TERHUNE

ONE DAY last winter, two airedale terriers were scampering across an end of Broadmoor Lake, Colorado. One was a heavy-set and elderly dog. The other was a slender eleven-month puppy. The older dog was in advance, the pup following politely at his senior's heels.

A film of frozen snow covered a gaping air-hole. Into this, unheedingly, the old airedale stepped. At once he plunged deep into the icy water below. The sides of the air-hole were too steep and too slippery to admit of climbing out. The cold of the water numbed the luckless dog's muscles.

Far off were some skaters. The puppy saw them. He set up a thunder of barking to attract their attention. Presently one of them heard the plangent racket and saw what was wrong. He started toward the drowning older dog. But the skater was a long way off, and the poor old dog was growing weaker every moment.

The puppy saw there was but one thing for him to do. Bracing his feet on the slippery ice at the edge of the air-hole and digging his toenails into it, he bent down and seized the older and heavier dog by the nape of the neck. He held on with all his might, struggling to keep from being drawn under by the other's weight, and not strong enough to drag the water-sogged and larger dog up to safety. His own grip on the ice was not firm enough to permit him to heave with any power.

There he held the old dog until the skater came up and rescued him. I tell the yarn, not only to illustrate airedale pluck, which no sane observer can doubt, but also to describe airedale brain and reasoning power.

This same reasoning power, plus a certain uncanny instinct, was illustrated in the northwest not long ago, when an airedale, taken from the home and the master he loved, found his way back to both, unaided, over nearly four hundred miles of trackless wilderness.

A very few decades ago there was no such dog as the airedale. His various blends of physique and temperament were distributed among several distinct breeds, such as the shaggy otter hound, the wire-haired terrier and one or two others. From each of these breeds, the airedale has taken something worth while—the terrier's alertness and gameness, the otter hound's scent-powers, courage and solid vir-

COURTESY OORANG KENNELS

YOUNG, BUT ALL AIREDALE

Even the puppy is endowed with a remarkable capacity of reason and true airedale courage.

tues, and so on through the lot.

The most generally accepted version of the airedale's origin is this: Among the mine-pits of the Ayr, the various groups of miners each sought to develop a dog which could outfight and outhunt and outthink the other mines' dogs. Tests of the first-named virtue were made in intermine dogfights. Bit by bit, thus, an active, strong, heroic, compactly graceful and clever dog was evolved —the earliest true form of airedale.

Then the outer world's dog fancy got hold of him and shaped and improved him into the show-type airedale terrier of today. The process was not long, for the newly evolved dogs were quick to adapt themselves to their creators' wishes. Out of the experiments emerged the modern airedale, a dog that does not know the word "fear." He is swift, formidable, graceful, big of brain, an ideal chum and guard.

There is nothing he is afraid to tackle. There is almost nothing he cannot be taught if his trainer has the slightest gift for teaching. To his master he is an adoring pal. To marauders he is a destructive lightning bolt.

COURTESY BRAYVENT KENNELS

A ROYAL AIREDALE

A fine member of his breed who sold for two thousand pre-war dollars and was worth it.

PHOTOGRAPH INTERNATIONAL NEWSREEL

THIS IS LARRY THE FIFTH

A champion among airedale poses. Once the outer world got hold of the airedale it improved him as a show dog.

In the southwest and elsewhere, the otter hound ancestry and its traits have been made use of by numerous sportsmen in teaching airedales to do the work of pointers and setters and other hunting dogs. For nose and for steadiness and for snappy retrieving and for finding fallen birds, these field-trained airedales have given surprisingly good account of themselves.

There is nothing thrown away in an airedale's make-up. Every inch of him is in use. Compact, wiry, he is "all there." No flabby by-products. A perfect machine —a machine with brain, plus.

Crossbreeding is apt to have a stimulating effect on the mind and the physique of all dogs. The airedale is still so new, as a distinct breed, that he retains an unusual amount of the sense and the strength of the primal cross-breed, an asset of high value in this era of delicate and inbred dogs of so many kinds.

At almost the outset, the airedale's long tail was sacrificed to trimness and to

fighting efficiency. Don't get the idea he is born with the smartly stumpy tail he now sports. It is amputated, at precisely the right length, while he is a baby. He is born long-tailed, just as the bull-terrier and the Great Dane and the Doberman are born with lop ears, and later have their ears cut, painfully, to the shape and pricked position demanded by fashion.

Centuries ago, so it is said, a tax was imposed on all dogs' tails—presumably inferring a tax on the whole dog. Rich men paid the tax in order to keep their dogs. Poor men loved their mongrel dogs as much as the rich loved their thoroughbreds. But they could not afford to pay the high tax. So they hit on the idea of cutting off their dogs' tails, so that there should be no tail to be taxed. The animals thus docked were known as "cur-tailed dogs," shortened presently to "cur dogs" or to "curs."

The airedale's tail was cut off for no such cause as this, but to add to his trimness and to be out of the way in a fight. It adds a finish and a style to his looks, this semi-erect tail stump.

COURTESY BRAYVENT KENNELS

THEY CALLED HIM GOLD HEELS

Every inch of the airedale is in use. Compact and wiry, he is a machine with brain, plus.

COURTESY OORANG KENNELS

THE AIREDALE IS HERE TO STAY

Bred by miners who vied with each other in their dogs, he has become a dog of popular fancy.

For a long time there was a belief among many that airedales' tempers were as short as their tails. This is not true. The airedale will not avoid a fight. But he seldom goes looking for one. As a rule he is courteous to his master's accredited guests and to the world at large. He minds his own business and does what his owner tells him to. Incidentally, he shows powers of brain and of instinct found in few other dogs. He can be humanized to a remarkable extent.

Yes, the airedale is worthy of the words of the late Senator Vest, of Missouri, in his glorious appeal to the jury sitting on the suit of the owner of a dog for damages from a neighbor who had wantonly shot the man's friend and companion.

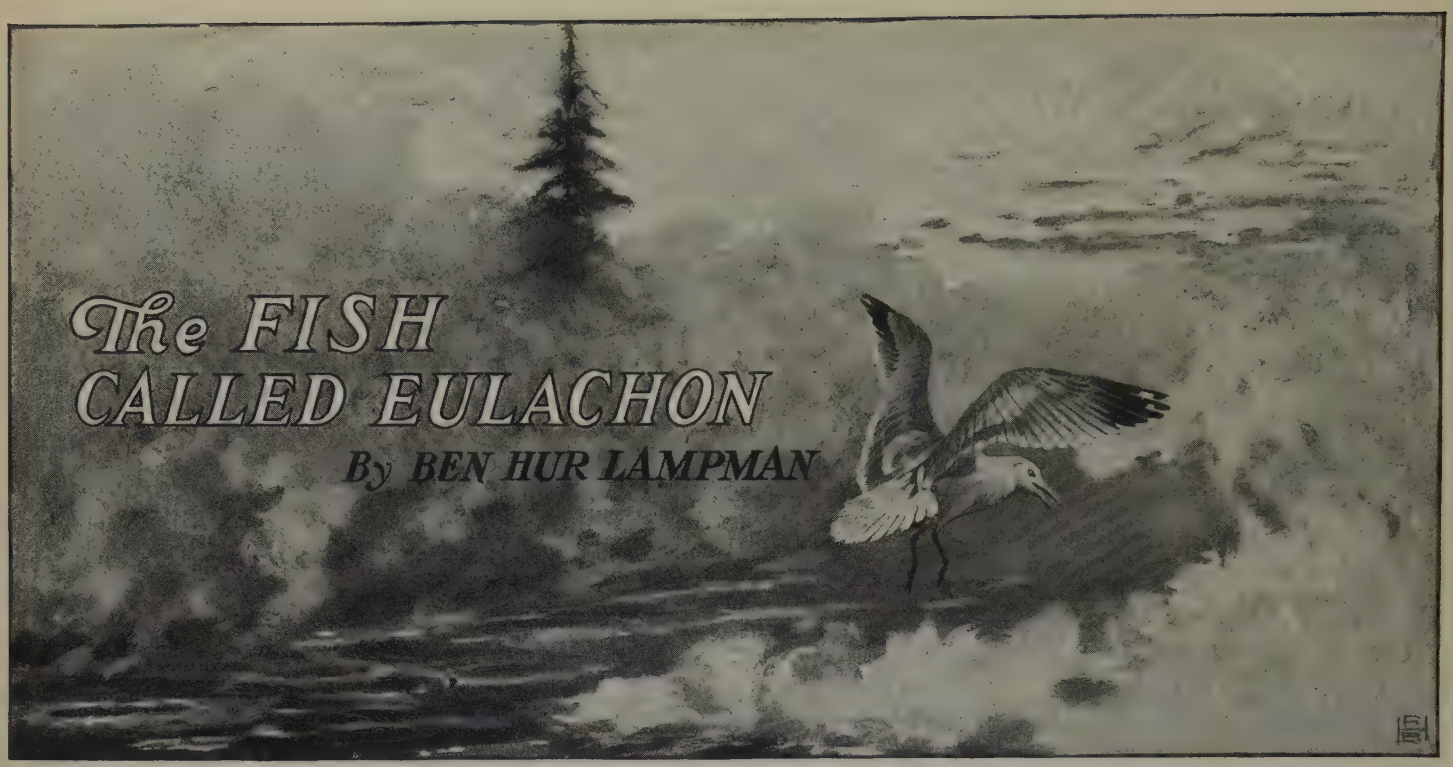
Fashion can never rule him out of existence. Too many people have learned to value him above any other breed. He is here to stay. He has won his right to permanence.

The Spider's Captive

By Rosamond Norman

THE IDEA of strength is not usually associated with the grace and filminess of the spider's web. But late in the summer a web came under my observation which showed more strength and endurance than would seem possible in anything so fragile.

My father and I were hiking in Millard Canyon in the Sierra Madre Mountains near Pasadena. By the side of the trail we noticed a bird about the size of a linnet suspended motionless in the air. On closer view we found that the bird had been caught in the center of a large spider web, stretched between two bushes. The bird had evidently fluttered considerably at first, but had only succeeded in becoming more and more entangled in the treacherous meshes. Needless to say I hurried to the rescue. As we approached, the little bird hung practically motionless, eyes bright with fear, wings held helpless by the web. After taking it from the web, I removed all the sticky threads still wound around its wings. Then it flew away, seemingly no worse off.



"MASTER, I MARVEL HOW THE FISHES LIVE IN THE SEA"

THERE was a distant clamor down-river, the strident, eager voices of the gulls. Through the mist of morning, rolling in slow surges of pearl across the sand bars, a fir stood momently revealed, and the spire of it was touched with the gilt of sunrise. A gull swept by, on wings that all but brushed the dark water, and as it flew the bird searched the surface with keen eyes. A gray gull lost in grayness. The clamor mounted, trebled, and drew near and nearer, still hidden in the veil—until a thousand tongues were shrilling somewhere out yonder where the tributary Sandy poured its bright offering into the vast Columbia. Then, as a curtain is drawn from the stage, the mist lifted and was gone, and the screaming wanderers glinted in the warm light. Hovering, thrusting, wheeling, crying their word of the wonder beneath them, celebrating the incalculable largess of the sea, they followed a quarry up the lesser stream.

The town of Troutdale stretches along the Sandy and climbs a hill to pause halfway, setting an outpost of roses. In mid-March the tourists have not come. There is little to do save to talk of the last catch of salmon trout, the steelhead hooked and played below the wagon bridge, and the nearness of the eulachon run. Ought to be here most any time now. Never miss it more than a few days. In the main river long ago. Why, as a matter of fact. . . .

The gulls are yonder, screaming, dipping, whirling. And a breathless boy racing up from the stream. He has seen them, the advance guard. He is shouting the news, and within an hour the word has raced from village to city and across a county, and is spreading far and wide through western Oregon. Even now men are wading into the stream, flourishing dip nets, peering to mark the eulachon.

"Smelt are in the Sandy!"

The Sandy is a comely stream, either in the mountains of its birth, where it threads the canyon with hurrying silver, or where it flows in contemplative emerald to its union with the Columbia. Lewis and Clark gave it the name it bears, for the great burden of sand it carries down to its mouth, and there arranges in a multiplicity of bars that never quite suit its fancy but must be shifted anew each season. The Sandy is a whimsical mother, saying to her fishes that return from ocean—"I am here, or perhaps I am there; seek for me, children!" But an Oregon river for all that, loved of salmon and trout and fishermen—and most of all by the eulachon.

A trifling fish, the eulachon, individually considered, scarce longer than the span of your hand, slim and rounded, and witless, as well, and of a dull leaden color untouched by any shimmering scale. But in the aggregate this least of anadromous fishes, commonly and wrongly called a smelt, to which it is but cousin, is almost an awesome evidence of the fecundity of river and sea. To deal with its numbers in mathematical calculation, where but a minor portion of the main run turns into the Sandy, is to

"A BREATHLESS BOY RACING UP FROM THE STREAM"

clutch at the fringes of infinitude. For the current itself is clouded with them, the gravel of the river bed is obscured as by darkness, and that which the eye perceives from a given station is true of the river for a matter of miles—and this ceaseless advance of the eulachon to the spawning beds must continue not for days, but often for weeks. One realizes the futility of estimate, when the pressure of the living tide thrusts from the water, to the sand at his feet, a luckless score of that myriad company. They yield to death most tamely, almost without struggle, as though dimly aware of their inconsequence. A gull slopes heavily over, curves, retraces his course, and mutely bids you begone.

On a March day of the present year, when the ascent was at its height, an acknowledged authority made careful estimate of the number of eulachon in the river. He counted the days and reckoned the area, and mumbled a pencil, and divided by this, and multiplied by that, and triumphantly announced that at the close of the week not less than 6,000,000,000 eulachon were present or accounted for. And thoughtful citizens read of this in their newspapers and were properly astounded, since it was evident that such a host of eulachon might furnish luncheon for all the people of all the continents, and every island, too. Pray bear in mind that the run in the Sandy is but an offshoot, as it were, of the much heavier run which enters the Cowlitz River in Washington, somewhat nearer the sea. If, therefore, 6,000,000,000 eulachon were in the Oregon River, how many had ascended the Cowlitz? And if—but here conjecture failed, and pressed both hands to its temples.

Six billion eulachon in the Sandy? The river twinkled to hear it. Very well, if they would calculate, here was a problem for the ablest. On the eighth day the ascent was heavier than at any previous time, and for the following fortnight that miraculous sending of fishes swept upward, unabated, until all estimates became trivial and confused, and the tallymen gave it up and went home and told their wives, darkly, that there was such a thing as too much fried smelt. And though but a short time before all Oregon had rejoiced at the fish, and welcomed the returning eulachon—the finest of food fishes—as they should be welcomed, it befell that you could not give them away, and that if you insisted it was at peril of strained relations with old friends.

In a single day 50,000 people have visited the river, along a frontage of two miles. They have made an outing of it, a festival—they are eager as the gulls and thrice as clamorous. Hopeful novices from other parts bring trout rods and tackle and are laughed to scorn, since no lure diverts the eulachon from its propagative purpose. And some have nets rudely fashioned of wire mesh, and always there is an enthusiast who has lashed the family bird cage to a pole—but the regulation dip net is of linen mesh, its hoop two feet across, its bottom tapering to a point. Mounted on a ten-foot pole, the

dip-net of an expert literally scoops the eulachon from the river in such quantity that the burden is lifted only with difficulty. You thrust the net upstream, downward to the required depth, and bring it forward at a rate to exceed the green current. Tick. Tick-tick. Tick. Tick-tick-tick. The captives signal their capture by those faint impacts. One draws the pole sharply backward, that the net may cross the hoop and seal itself—backward and upward, sagging with trophies.

Launch and raft are heaped as with silver ore. Men and women, burdened with dripping sacks, struggle and pant up the steep trail to the highway. A sprinkle of rain patters on rock and river. They laugh like children to feel it. What is rain to them? They are thigh-deep in the cold water, they are balanced on perilous ledges, they are teetering cheerfully on wet gray rock. They are sharing the bounty of the sea. A splash. A welter of foam and flailing arms, and up from the river rises one who leaned too far. No matter. He has regained the driftwood, dripping but undismayed, to resume his fishing. From the willows below the bridge a wisp of smoke rises into the moist March morning. Beside the fire sundry masterless men, strollers, vagrants, wandering workers are frying eulachon on a battered tin. In many a camp they will tell the tale of the river that ran black with fish.

"SMELT ARE IN THE SANDY"

A proud lady has alighted from a fine limousine, up there on the crowded highway. She is puffing ponderously, but with elegance, down the brief trail. Only a penny a pound, lady! She surveys the motley scene with hauteur—yet with a trace of outland curiosity. Buy them here, lady; only a penny a pound! She has engaged a market fisherman in barter. A guffaw rises, wells, and echoes away across the river. Did you hear what she asked him?

"Are you quite certain they are fresh?"

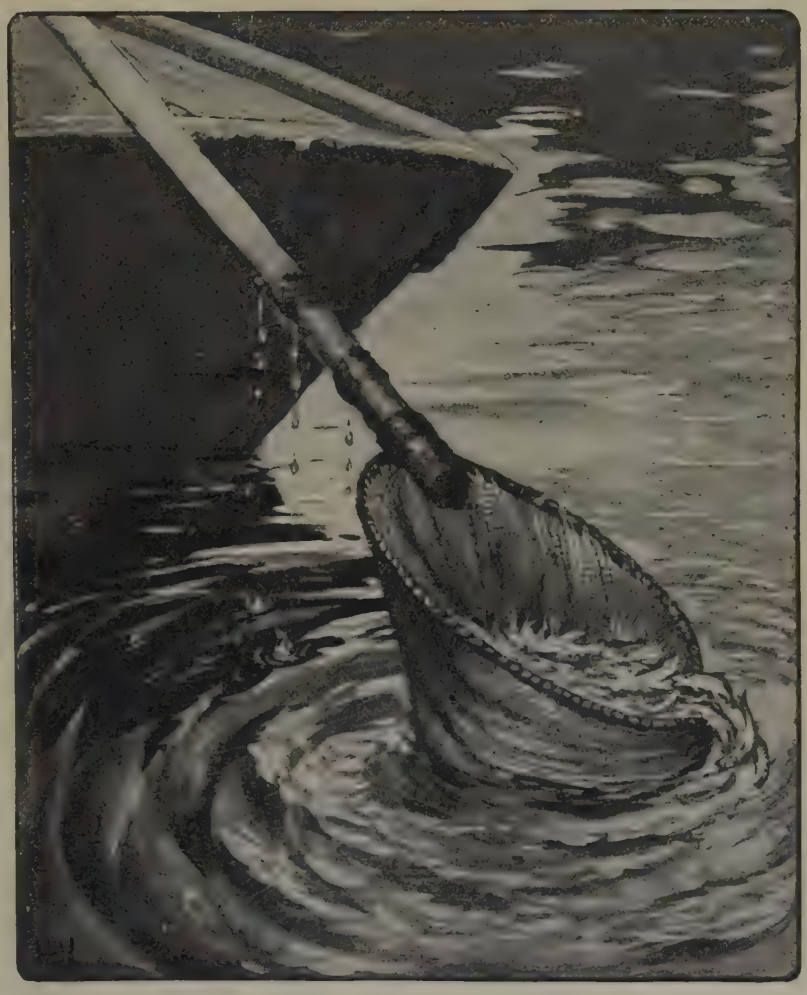
And do the nets, indeed, bring naught save eulachon to the surface? As to that, the story is told of a fisherman who thrust his net into a thick stream of the migrants, scooped his mightiest, and felt the pole all but wrenched from his hands. Something clad in silver mail, something burnished, flashing, fighting, turned and twisted as he strove to lift it. And the huge steelhead, far longer than your arm, tore through the mesh and left him there to mend his net. So far as local history runs this was an unprecedented adventure, for when the eulachon are in the river the trout retreat before them, it is said—as well they might. Eddy and riffle are theirs no longer, unless shared with a stifling, plebeian horde, blindly intent upon perpetuating the run. And a trout is a gentleman, a trout is, who likes to take his ease as he takes his fly, gracefully.

The identity of the eulachon is the group identity. It possesses for its motivation that which has sometimes been called "the group soul." The vast shoals at sea, forever preyed upon by predatory fishes and birds, forever seemingly undiminished, answer to a single impulse, as a body comprised of cells answers its impulses. To feed in the pastures of ocean, to hear the call, to seek the brackish waters of the lower river, to swim steadily forward into the sweetness of the great stream, to cleave together until the spawning beds are reached, to void the eggs, to fertilize them, to weaken and die—as one fish, this incalculable fraternity!

The group consciousness. There is no lack of parallels in nature, and if the good dame is kind to you, one day you may witness the loveliest parallel of all—a flight of Monarch butterflies, such as frequent the prairies of the mid-west. A butterfly is always an event, minor but happy; as grateful to the vision as bird-song to the ear. But billions of butterflies! Out of the western sky, against a low red sun, a mighty host on fragile, fluttering wings, swart as a cloud, stretching to either hand as far as

eye can see, interminably pouring from the sunset. What fount of fairyland sent these forth? What call assembled them, from their far scattered flowers, to join this concourse? Whence? And whither bound? It is twilight. They have dropped to rest upon the shade trees of a country street. And the tall, tall cottonwoods, the broad maples, no longer are garmented with leaves, but have for foilage the softly waving wings of butterflies. And night comes, and they rest in the hostels of the trees, and on the velvet mullein by the roadside, and every shrub and weed is boniface to a thousand. At sunrise they take flight again. Out of the purple west the elfin host continues to advance, undiminished, wonderful to see. Yes, there are parallels in nature.

The natural law which governs the life and migration of such a fish as the eulachon is fraught with a wisdom plain to read. Each parent swims onward to death when it seeks the spawning beds. Its purpose achieved it can but yield to painless, dim dissolution, sinking to the gravel with no rebellious strugglings, and yielding its softened tissues to the river. The spawned salmon rebels against the fact of death. Blinded, smitten, ghastly with the gray fungus of its wounds, bloodless and thin, it casts its unhappy bulk from the stream time and again ere it concedes defeat. But the eulachon merely dies. For weeks after the run is over, bait-fishermen will draw from the eddies on their hooks the empty jackets of those patient, sacrificial little pilgrims. So prolific a fish, if its own life were not taken when the spawn was deposited, if other fishes and many sea-birds did not prey upon it, must in profound terms of arithmetical progression presently increase to such numbers as actually to choke the streams, to strangle the very waters.



"SCOOPS THE EULACHON FROM THE RIVER"

Marco Polo made due report of an old world equivalent of the eulachon run—poor Marco, whose veracity was vindicated by time alone. As he journeyed with his uncles into Asia they rested one day at a point distant from the sea, and beside a river. There they found a convent, an outpost of the Christian faith, and Marco plied the mild nuns with eager questioning. What manner of fishes frequented the stream? On what tackle were they taken? Marco was a boy in those days, a mere stripling. Forgive him this. It was a fair world to him, fair and filled with wonder. What fishes, prithee?

And the gentle sisters told him that, punctual as the Lenten season—nay, even as Lent drew nigh—a mighty company of exceeding fine fishes appeared as from nowhere. Mark you, the stream showed never a fin. And then, of a sudden, the waters were thick with as excellent provender as ever a thrifty prioress rejoiced to see. The river was itself a soup of fishes. Now clearly this was a miracle sent from heaven, and especially adapted to the Lenten fast, as Master Marco could judge for himself. The lad may have thrust his tongue in his cheek, but he was a faithful chronicler of all he saw or heard, and he set the matter down as he had it. It was, indeed, a miracle—such a one as befalls each March in the Columbia and its two favored affluents, the Cowlitz and the Sandy.

On the Oregon coast an infinitesimal fraction of the myriad sea life enters the Columbia River and proceeds to its destination in a single mountain stream, a mere thread on earth's surface. Very dimly, and with the awe of children, we grasp some faint conception of the larder of ocean. With the Third Fisherman of Pericles, let us repeat—

"Master, I marvel how the fishes live in the sea."

Ovis Poli

By KATHERINE G. BRYANT

IN THE mountains of Turkestan, Theodore and Kermit Roosevelt have gone to seek the mighty Ovis poli, a gigantic sheep first brought to the attention of the western world by the famous thirteenth century globe trotter, Marco Polo.

What sort of a creature is Ovis poli? Where does it live and what are the chances for the complete success of the Roosevelt party? A published statement, purporting to be an interview in Chicago just before the party left, was to the effect that this animal with horns of an unbelievable spread had scarcely been seen since its discovery, and endowed it with a rarity and a mystery that were at once fascinating and provocative of further inquiry. There seems to be general agreement on the point that Marco Polo did first bring the animal to the attention of Europeans. It was not until 1840, however, that the animal was definitely described and named Ovis poli after its discoverer.

The publication of this information at once led sportsmen to seek the animal's haunts, with the result that many specimens were secured and brought to the attention of the scientific world. Since that time the species has been described and redescribed many times and its relationships and position in the bovine genus Ovis, or sheep, definitely settled. As a result, Ovis poli is no longer a mystery or even a particular rarity, as mounted specimens may be seen in a number of the principal museums of the world.

Kermit Roosevelt visited Washington shortly before starting on the Asiatic trip, and carefully examined the specimens of this animal, including a magnificent mounted one, in our National Museum. These specimens are all from the vicinity of Tagdumbash in the southeast part of Russian Turkestan known as Pamir, and in common parlance, because of its great general elevation, as "the roof of the world." They were secured by Dr. William L. Abbott, of Philadelphia. Despite shrinkage in mounting, the specimen stands nearly four feet high at the shoulder, and its great horns, measuring sixteen inches in circumference at the base, are nearly five feet long along the curve and nearly four feet from tip to tip. The latter measurement compares quite favorably with record heads reported by authorities on big game.

Keen of eyesight and even keener in sense of smell, these giant sheep live in the midst of the highest mountains. The animals are not found among the rocky crags but principally on the high-rolling plateaus of from ten thousand to eighteen thousand feet elevation, where they feed up to the snow line. Despite the fact that it habitually lives at such great heights, the sheep seems to be affected by the altitude and, when running at full speed, opens its mouth as though in want of breath. This might be in part accounted for by the great weight of its horns which causes it to carry its head quite erect and gives it a peculiar stiff shoulder movement when running. To ease itself of its enormous burden and to rest the great muscles of its neck, the animal, when lying down, frequently rests its horns upon the ground. At such times the under parts of the neck and jaw do not touch the ground by several inches. In fact, because of the shape of its horns, unusually well-developed in a group noted for its frontal armature, the animal can only touch the ground that is about it with its mouth.

OVIS POLI

The general color of the upper parts of adult male in summer is light-speckled brown; most or all of face, throat, chest, under parts and legs white, the white extending largely on to the outer surface of the thighs. A black line runs from the nape of the neck to the withers. In winter the hair is considerably longer, and forms a well-marked white ruff on the throat and chest. Viewed from the side the horns make a complete circle and a quarter. Specimen in the U. S. National Museum.

The Life of the Song Sparrow

By A. BROOKER KLUGH

CHEERY of song, a cosmopolitan of the bird world, the song sparrow is one of the most familiar of our North American birds. Practically everyone knows this little fellow as well as the robin, the bluebird, the Baltimore oriole and the chickadee. With two of these it shares the honor of being a "harbinger of spring" in the northern United States and southern Canada.

This species has a wide range, breeding from ocean to ocean and from Mexico to Alaska on the west coast and from Nova Scotia to southern Virginia on the east. Its regular winter range in the east is from New Jersey and southern Illinois south to the states of the Gulf. On the west coast it ranges in winter from southern British Columbia to Mexico.

Like many wide-ranging birds and mammals, the song sparrow differs in size and color in the different parts of its range. Intensive study has shown that these differences overlap one another so that we really have in North America a single species of song sparrow with a number of subspecies.

This gradual change in the appearance of the song sparrow as we pass from place to place is found to be related to conditions of the environment. In general we may say that the size of song sparrows is related to latitude, while their coloration is related to rainfall. Thus the subspecies of Mexico (*Melospiza melodia mexicana*) is the smallest, measuring only about six inches in length, and there is a gradual increase in size northward until in the Aleutian Islands we find a subspecies (*M. m. sanaka*) nearly nine inches long. The subspecies of arid regions are pale, the palest of all the song sparrows being the race (*M. m. fallax*) which inhabits the western deserts. Those of humid regions are dark in coloration, the darkest subspecies being the sooty song sparrow (*M. m. rufina*) of the northwest coast, where the annual rainfall is about a hundred inches. The subspecies of eastern North America (*M. m. melodia*) occurring in a region of moderate rainfall, is intermediate in coloration between those of arid and humid regions. In California, where the country is broken into systems of mountain ranges and intervening valleys, numerous subspecies occur, and many of these are nonmigratory.

The song sparrow is not a bird of the forest or of the open fields. It is essentially a bird of the thickets, especially along watercourses. In densely forested regions it is to be found only where willows, alders and dogwoods fringe the streams or rim the lakes, marshes and bogs. In agricultural areas it seeks the shrubby borders of fields and orchards and gardens.

SONG SPARROW YOUNGSTER

Note the tufts of natal down still sticking about the head.

The song of this species is acclaimed as one of the most cheery refrains in our bird symphony. Vivacious, frequent and whole-hearted, the bird is well named for its song. Still one may say that no two song sparrows sing exactly the same song. If our ears are at all keenly attuned to bird music, we soon learn to discriminate between the songs of the different individuals.

Three pairs of song sparrows nested close to my cottage at Puslinch Lake and each male had a distinctive song, so that I could tell where each bird was when he was singing. These three birds had a regular route which they followed day after day for weeks, and they followed each other in fairly regular order. One would perch on the woodshed and sing; fly to the fence in front of the veranda, sing again; pass on to the fence at the east of the cottage, sing there; fly to a little tree at the corner of the cottage and sing; fly to the edge of the woods at the bottom of the garden, sing there, and then repeat the round. The other two would follow, selecting the same perches, so that the three were frequently singing from as many points of the compass. This route was gone over by each bird from eight to ten times a day.

I have found individual songs to be equally distinctive at every place where I have spent a season, though I have not elsewhere observed the regularity of route. In one place where I have spent three successive summers I have heard a male with a decidedly characteristic song each successive year, and he is always within a few yards of the same

EGGS, MOTHER AND OFFSPRING

Above are the eggs which vary in markings. In the center is the mother song sparrow watching over her babies. To the right are the hungry three-day-old youngsters demanding food with all the width of their mouths.

spot. I have noticed, however, that the same song sparrow does not *always* sing exactly the same song. Some individuals are remarkably constant in the character of their song, while others have two or more songs on which they ring the changes.

My friend, Dr. E. M. Walker, who has a wonderfully acute ear for bird music and a great facility in imitating it, tells me of a song sparrow which had seven distinct songs. Sometimes one finds a bird of this species whose song deviates entirely from normal type. I came across one such bird in the middle of a large peat bog—a rather unusual home for a song sparrow. Its song had the usual three high-pitched opening notes, but after this, in place of the complicated warbling trill of the usual type of song, there was a low trill on two notes.

As with many species of birds, the male song sparrows precede the females on their northward migration. Without much doubt it is the male who picks out the nest site. This done, he claims sole right to this particular spot as far as birds of his own species are concerned.

A male song sparrow had apparently decided to have a nest in a hedge close to Dr. A. A. Allen's house. He had been announcing the fact by singing in the immediate vicinity for several days. One day he caught sight of his own reflection in a window. Another song sparrow trespassing upon his territory? He dashed into the glass in a fury to drive it away. The window met him as hard as he met it. His ardor was not dampened. He kept at his task of driving away that other bird all that day and all the next day, barely taking time off to eat. As the days rolled by he continued his fight, and nothing would discourage him. He had discovered that another song sparrow claimed every downstairs window on that side of the house, and he continued to fight. There were so many windows that it gave him little time to eat or sing, and he had to go without a mate from early in April until the middle of May. When at last a female settled in his locality he grew less pugnacious and ventured to the windows only a few times each day to make sure that his rival did not steal a march on him.

The nest of the song sparrow is usually placed on

or near the ground. The most usual site is on the ground under the shelter of a bush or a tuft of herbage, though nests are frequently placed close to the ground in bushes, or in heaps of dead branches on the ground. Other sites may be among the stumps of a stump fence and in cavities under overhanging banks. In the north nests are often placed on the lower branches of large conifers and even in small trees at a height of ten feet from the ground. The nest is composed of dry grass, rootlets and leaves, lined with finer grass, sometimes with hair.

The eggs are from three to eight, usually four or five. They are variable in markings and coloration, being greenish or grayish white, spotted and blotched with brown, the shade of which varies from reddish to chocolate, and with lavender or purplish shell-markings. An egg is laid each day until the set is complete. For the first brood this is about the last of May in the northern states.

The period of incubation varies from ten days to fourteen days. Both sexes take turns in this duty, though the major part of it seems to fall to the lot of the female. For the first day or two after hatching the mother broods the young pretty constantly. If the strong sun beats upon the nest at any time of the day, she stands at the edge of the nest to shield the young. This is very necessary because the young will gasp in distress when exposed to the full sun, even for a few minutes. Both parents take part in feeding the young. Two, and sometimes three, broods are raised in a season in the warmer parts of the range.

When the young hatch they are, as is the case with all the higher birds, scantily clothed with a few long tufts of sepia-colored down. Feather growth is slow for the first few days. Then it is more rapid, so that when the young leave the nest at the end of twelve to fourteen days they are fully clothed in the juvenal plumage, with some tufts of the natal down adhering, especially about the head, to the ends of the body feathers. The quills of the wings develop much more rapidly than those of the tail, so that when the young leave the nest their wings are about two-thirds the size of those of the adults, but the tail is very short and stubby.

There is no spring moult in this species, and the more sharply streaked appearance of the song sparrow in the spring, as compared with the softer streaking after the moult in the fall, is due to the fact that the buffy edgings of the feathers are lost by wear and the black streaks therefore stand out in strong contrast on a white ground.

The food habits of the song sparrow have been found to be 66 per cent of vegetable material and 44 per cent of animal matter. The largest single item in the vegetable diet of the song sparrow is grass seed of many varieties. Eighteen per cent of the vegetable food consists of the seeds of plants mainly classed as weeds. Berries, such as blackberries, blueberries, and others, are eaten mainly during July. Later in the season some wild fruits, as elderberries, bayberries and fruits of the woodbine are taken.

Insects make up about one-third of the animal food of the song sparrow. From May to August they compose more than half the food. They include caterpillars, grasshoppers, locusts, crickets, beetles, ants, bugs, including leaf-hoppers, spittle insects and leaf bugs. Dr. E. H. Forbush has recorded the song sparrow as feeding on canker-worms and the larvae of the gipsy moth and brown-tail moth, and during an outbreak of the army worm it was found that the song sparrow preyed upon these pests to a very considerable extent.

Thus not only does the song sparrow charm us with song, but serves us well with its diet of insects and weed-seed. Economically, as well as aesthetically the song sparrow is worthy of its popularity.

The Cottony Spiders

By S. W. Frost

ONE READS much about the peculiar ballooning spiders that glide through the air on their silken parachutes, like dainty milkweed seeds upon their fluffy white pappus, the orb-weavers of the garden that stretch their large radiating nets across every conceivable path, the pearl-like strings of beads which form the viscid strands of these webs, and the many other interesting habits of spiders.

But who thinks of going into the dingy, damp cellar to search for new or unusual spiders? Great was our surprise one day to find our cellar a veritable curiosity shop of quaint, cottony forms. These were the remains of spiders that had spent their busy days silently and unceasingly gathering house flies and other annoying insects. They had worked diligently, unknown to the house wife. Their lives spent, they now rested, clinging to dilapidated webs and old beams, as monuments of their faithful work. Their bodies were covered with a soft, cottony growth and they resembled mummies wrapped in clean, white linens. We called them the cottony spiders because of the growth of white fungus that had been stimulated by the dampness of the cellar and had endowed them with their beauty. Though you may never find such spiders, it is worth while to visit unusual places for there is always a reward for the one who keeps an eye open for the peculiarities of Nature, who loves to surprise us.

The Great Alaskan Brown Bear

By HAROLD McCRACKEN

(ILLUSTRATED BY A FULL-PAGE INSERT IN COLOR FROM A PAINTING BY R. BRUCE HORSFALL)

THE GREAT Alaskan Brown Bear, or "Kodiak Grizzly," as he is popularly known, is the largest of all present-day carnivors or flesh-eating animals in the world. He is also one of the most powerful as well as one of the most interesting. His fame has lately become quite as far-spread as that of the African lion or the Bengal tiger; and his reputation has been that of a plunderer, and a most dangerous and ferocious beast. Yet, in long experience and association I have found him to be a very amiable and peace-loving big fellow—extremely curious, though cautious of anything suspiciously exotic, highly intelligent and quite unaware of his brute power and strength.

In Alaska there are a number of varieties of these so-called Big Brown Bears, ranging over the greater part of the territory. The more typical forms are restricted to the coastal regions, distributed in varying abundance from the northern end of the Alexander Archipelago, which forms the "pan-handle" of Alaska, up into the Arctic. Similar big bears are also found, though generally in less abundance, on almost all of the rivers that make their way down through the Alaskan mountains and drain into the Pacific Ocean, Bering and the Arctic Seas—though they are evidently a coastal animal. This because fish is their main item of food.

A KODIAK MADONNA

A mother bear rears a family only every second or third year, generally of two cubs, sometimes one.

The particular district where these animals are most abundant, and where they seem to be at their height as an outstanding species, is the western end of the Alaska Peninsula, especially along the Bering Sea side between Port Moller and the head of Pavlof Bay, and the mud flats of Izenbeck Bay. This is a rolling tundra section backed by a range of rather rugged mountains, today virtually uninhabited by either natives or whites, and because of the unbroken character of its coastline one of the most inaccessible sections of the territory—indented by but one bay, a harbor for small boats only, in a stretch of almost one hundred miles. It was in this particular section that I did the greater part of my hobnobbing with these big brown bears.

One of the most interesting phases of the life history of these big fellows is the way they come into the world. The young are born while the mother bear is still in her hibernation quarters; they are blind and helpless, not much larger than bull-dog puppies at birth, appearing almost as though they had been prematurely born and weighing only from about nine to fifteen ounces. Yet, these same tiny creatures are destined to develop into the largest of carnivores. But in this particular phase of their life is shown one of the perfect plans which Nature has developed. The mother bear has gone into hibernation for the long Arctic winter under circumstances which compel her to exist on merely the surplus energy which she has stored up in her own body. Thus for her own means of survival are the young born so tiny that they will make but a minimum drain upon her energy and vitality until she can again go out to seek food and nourishment in the spring.

Bears do not go into hibernation just because they want to; nor do they seek the shelter of a winter den because they cannot stand the cold weather. It is merely an alternative for living under conditions when food is hard or impossible for them to procure. The bears will stay out just as long as they can find anything to eat. I have seen them out in that section as late as the first of December,

when there was over a foot of snow on the ground, and when they would have to break the ice in the streams to get at the salmon.

A mother bear usually rears a family only every second or third year, and it generally consists of two cubs, though sometimes but one, and rarely three. I have heard of even five cubs being seen in one litter. Unlike most of the other larger or big game animals, the males of which gather several females into their harem, the mother bear is generally courted by several males. This probably explains the appearance of such a variety in their families.

The winter den is invariably well up in the mountains, and may be a hole dug in the side of ridge, a natural cave or merely a recess in the rocks, which will be covered over with a protecting roof of the drifting snow. The cubs are from six weeks to two months old before the mother leaves the hibernation quarters. When brought forth they are about as large as a medium-sized airedale dog.

SALMON PROVIDES THEIR MAIN DISH

Grass and roots, with an occasional ground squirrel, make up the rest of the Kodiak's diet.

The snow in the valleys and out on the flats is well melted before the family is driven from their secluded home by the spring thawing. The mother bear does not, however, usually go directly down into the lower country; but spends the first few days wandering along the higher ridges, sleeping on the snow slides and feeding sparingly on the first tender shoots of grass, and digging a few roots or ground squirrels on the ridges where the snow has been melted. She is a lean and hungry-looking creature at this time, her reserve of fat having been completely used up; the muscles of her body are stiffened and her stomach contracted into a veritable "knot" not much larger than a man's two fists.

She will spend the first few days fairly close to the winter den, usually returning to it with her family for the nights. Then she will wander down into the valley, where she will dig "day beds" in the thickest growths of the alders and spend a week or so feeding on grass and roots.

It will probably be a month or more after she has left the winter den that she will take her family in quest of their feed of salmon, which are usually caught in salt water. That is, she goes right down to the ocean beach to meet the first salmon that put in their appearance in those parts.

The first bears which are seen in the early spring are generally the mothers with new-born cubs, while the big old males are, as a rule, the last to come forth from the winter's den. This is but natural in view of the amount of energy which the young cubs have absorbed from the mother, and her necessity of seeking food and nourishment at an earlier date than the males whose store has not thus been drawn upon.

The male bear never occupies the same winter bungalow with the female, and it is quite apparent that he has a strong dislike for youngsters. But the mother bear generally takes her youngsters back into the den with her for the next winter after they are born. This is probably one reason why she does not have a family every year. It is also quite common for her even to take them in the same den with her for their second winter, even though she may bring forth another family at that time. But when they are two years old they must seek their own way in the world.

An old fallacy is that bears exist through the winter months by "sucking their paws." Nature has provided that they keep alive through the long foodless period by assimilating the surplus fat which they have stored up during the summer months. When they go into the winter den they are "rolling fat," with a veritable blanket of fat from two to four inches thick over their whole back, and an abundance of it stored up throughout their body. When they come forth in the spring this fat has all been absorbed into their systems and they are thin and gaunt.

Another misapprehension regarding bears is their ferocity. The big brown bear has long been pictured as a veritable demon that would charge upon the least provocation and waylay the unfor-

tunate hunter from ambush whenever the opportunity presented itself. But through my experiences and association with over two hundred of these great Alaskan Brown Bears I have found even these greatest of the bears to be creatures of most amiable and peace-loving dispositions. They seemed to be full of intense curiosity, and the more intimately I got to know them the better the general opinion I grew to have of them and their intelligence and the less they impressed me as the ferocious demons which I had been led to believe they were.

MOTHER BEAR AND THE YOUNGSTERS

She is, like all other mothers, quick to protect her young. Otherwise the author does not find the Kodiak too ferocious.

The bear that comes nearest to being really dangerous is a female with young cubs. A bear may be of a surly, unpleasant disposition, or it may be peaceful and good-natured. So it does not mean that every bear mother that is accompanied by young cubs will rush everything in her way. One mother bear left her lone youngster not a month after they had come out of the den; and though it bawled as though it were being killed, she did not even look back, but kept right on going until out of sight in the distance. Shots fired at a caribou aroused her, and she forthwith took to her heels and left the bawling cub. We got the little fellow after a chase that lasted almost three hours and took us to the very top of one of the highest rocky peaks in the vicinity, near where they had their winter den. And though we waited until almost dark for the mother bear's return, she was not seen again. Another similar incident which occurred on the Alaska Peninsula was when a big she-bear that I had wounded very badly abandoned her family of three yearling cubs. I do not want to give the impression by this that the cases which I have cited are typical; for I have witnessed many that were just the opposite. In fact, I am satisfied that in a great majority of cases a mother grizzly or Alaskan brown bear with young cubs will fight upon a minimum of provocation. Yet, I want to show by the incidents cited, that these big brown bears are just the same as other creatures, in that they have the same individual variation of temperament that is found among human beings.

Bears are by nature nocturnal in their habits—doing the most of their traveling and feeding between sunset and sunrise. The middle of the day is usually spent sleeping in a day bed in some heavy thicket of alders. When the sun sets out over the Bering Sea these great lumbering creatures will wander out into the little open spaces in the alder patches and roll in the grass and stretch themselves before swaying down the well-beaten trail to their favorite fishing spot. If they are not disturbed it is likely that they will use the same day bed and go down and back the same trail for weeks at a time, so long as there are plenty of salmon and they may not move over a mile or two from the spot where they sleep during the day time. Very often, when they are feeding in the streams out on the tundra, they do not even go up into the alders to have their daily sleep but stamp down a bed right in the long tundra grass. This bed may not be over seventy-five to one hundred feet from where they do their feeding.

Salmon provides about 95 per cent of these bears' food, the other 5 per cent being grass and roots, the few ground squirrels that they catch in the early spring, and the few berries that are eaten in the fall. Most of these salmon are caught on the "riffles" or shallow, rocky places in the streams, where the bears have only to walk out and pick up a wriggling, flopping big salmon in their teeth and carry it out onto the bank to be eaten. There are hordes of the fish, and the bears seem to be rather particular as to the ones which they eat. I have watched bears catch five or six salmon before they got one that seemed to be to their liking. Then they would carry it out onto the bank, and, squatting down with it between their forepaws, very much as a dog often does with a large bone, they will hold it dexterously and proceed to strip off the layers of flesh

BENT ON A FISHING EXPEDITION

These bears live in the section of rolling tundra along the Bering Sea side of the Alaskan Peninsula between Port Moller and the head of Pavlof Bay and the mud flats of Izenbeck Bay.

from either side. Very often the top of one big paw will be used as a sort of plate on which to lay choice morsels.

The cubs are early taught to catch their own salmon, and they seem to find great enjoyment and sport in it. One of the most impressive things I ever saw was one of these Alaskan brown bear cubs trying to manage a big king salmon which he caught on a shallow riffle. The king salmon is at least twice the size of the salmon which the bears usually feed on, and he had quite a tussle with it. The big fish was almost as long as the cub, and was too large and heavy for him to carry out onto the bank in his mouth, but after much trying he at last picked it up in his arms and, standing on his hind feet, with the fish's tail flopping between his little, hairy brown legs, he walked proudly out onto the rocky shore with his prize.

One of the games which the cubs seemed to like to play was chasing the gulls which hang around to feast on the remains of fish left by the bears. The birds also seemed to enter into the sport. They would sit on a rock in the stream and let the cubs sneak up to within a very few feet of them; then, as the cubs would make a frantic dash to catch them, the birds would hop off and soar screaming to another rock a little way further on.

Another game which the cubs apparently enjoyed was a sort of contest to see who could be master of the top of large bowlders that they passed on their way to and from the fishing streams. When they would near one of these large rocks there would be a mad race for it, and a brisk scrap to see who could get on the very top and keep the others off. This was an especially good game if there were three young members in the family.

There is something peculiarly human about young bear cubs, and many times, as I have lain and watched them playing and enjoying themselves around their proud mother, I have been impressed with the similarity of their actions to those of young boys. An incident occurred while I was lying in a blind and watching a family of two cubs and their mother, which is one of my wilderness experiences that I have never been able quite satisfactorily to explain. We had been watching them for some time, as the mother lay in the warm, late afternoon sun, and the two cubs did everything that bear cubs could do, from wrestling and chewing each other's ears to having four o'clock tea. At last one of the cubs began to wander out away from the rest of the family, in a direction which would take him to a point where he would unquestionably get our scent. Yet we could not move. So we sat and waited to see just what this cub would do when he got his first scent of man.

There was not the slightest doubt as to the very moment that he got that particular scent upon the breeze. Like a flash he reared up on his little hind legs, almost at the same time wheeling around and

starting in a mad dash back towards his mother and brother. Before he reached them they were both up on their hind feet, and as he reached them the three started racing for the big expanse of alder thickets that covered the side of the mountain.

Now this much is certain: that cub had never before smelled the scent of man. We had just arrived in that section, and were the first to visit it that year. Yet there was not the least bit of hesitancy or doubt when he got that odor on the breeze. That he knew it was the scent of man is beyond any doubt, as man is the only enemy from which the bears would flee in any such manner. Further, he somehow had conveyed the warning message to his mother and brothers before he reached them, and in such a way that they understood perfectly. Wherein lies food for thought. How could that cub know the scent of man, when he had never before come in contact with it; and how could he so perfectly explain it all to the rest of his family in the brief time that he was racing towards them? Is it possible that that same mother bear had, in her own particular way, told her youngsters of their one great enemy which they must fear for the safety of their lives and their rich brown skins, and in such detail and way that the cub so unquestionably knew it upon the first contact? Personally, I am inclined to think that is the explanation.

That bears have a considerable amount of deductive intelligence has been impressed upon me a good many times. We had located ourselves in the tall tundra grass near to a place where several bears were in the habit of coming to fish. The first bear which came down from the alders varied his course so that he got scent of us before the next bear to leave the alders had gotten well on his way to the fishing grounds. Bear number two, upon seeing the hasty retreat of his friend and neighbor, immediately stopped and sat down on his haunches to try and figure it all out. He would look from the retreating bear to the direction in which he seemed to think the danger lay. Then as the first bear neared the alders towards which he was racing, the other bear got up and walked speedily back to where he had come out into the open. Sitting half concealed in the low brush he would gaze inquiringly down in our direction. There was no question but that he was very anxious to go down to where he knew the hordes of glistening, juicy salmon awaited him; yet his better judgment told him that there was some real danger down there, and he had better go hungry than walk into it. Nor did he venture down.

On several occasions I have watched these big grizzlies come onto our tracks across the hills or tundra, and seen them determine in which direction we had been going before taking to their heels to get to another and safer part of the country. They would usually stop stone still upon striking the trail. Then they would slowly and cautiously lower their big noses to the ground and analytically inspect the trail for several steps in either direction. That they could tell in what direction we had been traveling is beyond doubt, and is the same sort of an analysis and understanding which a hunting dog exercises when he is trailing his game.

That the great Alaskan Brown Bear can be all that should be expected of the greatest of present-day flesh-eating animals in brute power is also beyond doubt—when he so elects. There is probably no other creature in his class that equals him in strength or power; and when he once decides to fight, it is to a finish. Occasionally two of the monster males clash in mortal combat, and a terrible battle it is. I was told of such a fight by two Eskimo hunters who witnessed it. Nor did the battle stop until one of them was dead. The natives then shot the victor; though they said that both had been so badly torn and chewed up that it was almost useless to save the pelts.

In my experiences with bears I have shot seventeen, eleven of which were these Alaskan Big Brown Bears. Of this number only one unquestionably charged me. But that one put up such a battle that he established in me a lifelong respect for the fighting ability of the species. He was first shot at when about two hundred yards away; and when he at last went down, after being hit twelve times by large caliber bullets from four high-powered guns, he was less than fifty yards from us. This bear was hit twice in the head, one of these bullets striking him squarely in the mouth, and the other raking the skull and a part of the ball piercing the brain and killing him instantly. His pelt measured eleven feet four inches in length by ten feet six inches spread from claw to claw, and the animal weighed somewhere around 1,600 pounds.

By the time the first snow falls in the autumn the bears are at the fishing place which is nearest to their winter den; and there they will stuff and gorge themselves so long as any salmon remain, or until the streams freeze. By this time they are not as particular, however, as they were in the early summer, and will eat every salmon which they can get, no matter what may be its state or condition. Then when the streams are frozen solid and there is nothing left available for them to eat, they will make their way up to the winter den, crawl in and curl up for another long winter's sleep.

THE ANTS ARE NATURE'S TINY MOUND BUILDERS

In the summer they are active repairing and enlarging their homes, building them in perfect cones and free of vegetation, usually near together in the edge of the woods.

Ants and the Community Idea

By E. A. ANDREWS

Of Johns Hopkins University

IN DESERTED fields or young woodlands where the trees are not too dense, you may find knee-high mounds of earth piled up by ants. These serve as nurseries and dwellings during the warmer half of the year, while in the long, cold season the ants retire underground and sleep huddled together in thousands, packed in deep passageways that reach down from under the mound. Such mounds are common in some of the states along the Appalachian Mountain system. The chief mound builder in this region is very like the common mound builder of central Europe and is called *Formica exsectoides*. This ant is about a quarter of an inch long and is red and black. All summer long they are found running over the ground, swarming on the mound at times, running up and down the tall trees and out on the branches to the tips. What they eat is not so easily made out, but much time they spend getting the sweet liquid from some "plant lice." If any of you can see just what else they eat, the author would be glad to hear about your observations.

Of late it has been found that these ants touch the human pocketbook by doing some damage to trees that may be planted by the forester. In fact, it is said that they may kill little pine trees which stand between the nest and the sun, actually climbing up a few inches and stinging the tree till the bark dies all round about and the tree cannot live. This desire for a place in the sun seems deeply set in the ant's body. The mound, which is well made to make the warmth for the eggs and young, consists chiefly of earth brought up from deep below in the digging out of passageways, but it is partly a collection of surface materials collected far and wide around the home. Thus is slowly built up a great mound of mixed earth and vegetable bits, leaves, sticks and straws, which takes up the sunshine and becomes warmer than the outdoor air, and at the same time the weather compacts the surface together so that it forms a sort of sun-dried brick or tile covering that may shed the rain to some extent.

Within the mound are innumerable passageways meandering about, somewhat in stories one above the other, but with many stairs, or up-and-down-going passageways leading from story to story. How the ants find their way about in the maze of passageways, all of about the same size and all in the dark, is a problem yet to be solved.

Each ant is very powerful and, though it works by itself without help, can drag a bit of stone twenty times its own weight. The stones and mouthfuls of earth and the collected vegetable bits are all dragged up the mound toward its top and there laid down. While the wind and the rain roll much of this down again, more and more heaped-up, soft, earthy matter remains from summer to summer and is increased each year for many years, if all goes well. As the house grows grander the ants dig out more and more chambers in its inside part but do not break through to the outside very often, except about the bottom of the mound, where are many openings through which the ants come and go.

It is strange to find that all the thousands of ants in one mound are chiefly of one family, mostly the children of one mother or of comparatively few mothers living together down in the inside chambers.

Since ants are known to live in captivity seven years and longer, many of them may be the older sisters of the young ants each year, and as the family grows, the older sisters, like maiden ants as they are, take care of the younger sisters. After the early days of the community the duty of the mother seems to be chiefly to lay the eggs, while the so-called workers, which are the older children, do all the feeding and caring for the ever-growing and enormous family. These same workers dig the galleries below ground and dig out the passageways in the mound, and they go abroad to collect the food on the trees and to bring back the vegetable and other bits that they add to the house top. These workers may well be called the elder sisters of the young; all the workers are sisters or female cousins, and the whole community is a community of females.

AN ANT HOME TWO FEET HIGH

Out of the woods where the sun shines more, the mound may be overgrown by grasses and looks like a haycock.

To be sure, at certain seasons old houses contain many males and females that do not work; but these are temporary guests soon to be speeded on the great flight they will take away from the home to found some new homes at a distance. These fly out with fine wings; but before starting a new home they take off their wings, and henceforth the new colony has only wingless ants such as you commonly see.

Besides this kind of ant that makes the large mounds, there are many other kinds that lead a like life and build mounds in the western states as well as in other parts of the world.

The mounds of the "agricultural" or "harvesting" ants are to be found in dry or desert regions of the warmer parts of the United States. These mounds are somewhat of a crater or volcano style of architecture, with one larger opening into one side of the mound, like a blown-out volcanic cone with one side gone. In making these cones the ants excavate below ground the earth which is piled up more to one side than the other of the opening that is kept clear as the earth heaps up all around it. These underground homes are not only used for nests but also for storage of food, which is abundant at some seasons but lacking at others. These ants actually harvest their food, or part of it, since they eat the seeds of grasses and other plants that they collect from afar and carry to their homes. The chaff is thrown out about the mound and the edible seed taken down below to be eaten later on. Thus it may happen that in rainy seasons some of the seeds may sprout and, if not nibbled down by the ants, may grow up and raise the suspicion that the ants planted seed to harvest a crop later; but apparently they gather only "where they have not sown." Yet they do harvest wild seeds and profit by this in eating vegetable food in times of dearth; and thereby hangs a tale. In the Bible we are told: "Go to the ant, thou sluggard: consider her ways and be wise; which, having no guide, overseer or ruler, provideth her meat in the summer and gathereth her food in the harvest."

Many classical authors repeated such statement about the provident ant, so unlike the short-sighted grasshopper. And in comparing locusts, conies and ants Proverbs tell us: "The ants are a people not strong, yet they prepare their meat in the summer." However, in colder parts of Europe the ants were found to eat chiefly animal food and not to store up anything at all. Some even suggested that the familiar sight of ants, running about with their young done up in swaddling clothes looking like grains of wheat, might have misled the ancients into thinking that the ant was storing up wheat. At all events the old accounts were "wrong" for a long time, till, in India and in Africa and along the Mediterranean, students found that ants of some kinds actually did collect and store up grain just as was known to those who originated the Biblical admonition.

But if you cannot find large ant mounds where you live, at all events it is easy to find ant's homes under stones and old boards and other objects that afford protection and warmth without too much

THE LITTLE WORKERS KILL TWIGS THAT BAR OUT THE SUN

If one should cut into this home he would find it a spongy mass of earth with large passageways in all directions. Some of these serve as the nurseries of the whole family.

dryness. Here, under such roofs, the homes of the ant are but meandering passageways opening out into irregular chambers where the ants rear their young and assemble for rest. Such nests may easily be artificially imitated by making "formicaries" for study, placing plates of glass together with space between for the ants, supplying some earth and moisture and a little food, such as honey. In artificial homes the ants may live for many years and rear their young where they may be easily observed. How to set about this may be gathered from the great work on ants by W. M. Wheeler, where also are endless facts of the greatest interest to anyone wishing to know what has been found out thus far regarding all the life of the ant.

The use of the underground home for more than a mere place to sleep and to nurse the young is shown in other ants than the above "harvesters." Down in Texas, in Colorado, in Australia, and in Africa, some ants, "honey ants," store up honey in the home underground. Most ants are communists, each tends to share with its neighbor, and if one has eaten honey-dew from the ant cows or "aphids" on the trees, another with hunger can expect to be fed by the full one. In the "honey ants," some of the community stay underground and store up the sweet juice brought in by the rest, store it up in their own bodies so that they become greatly stretched out and unable to move much. These living storehouses of honey may hang from the ceilings of special rooms underground, parts of the home not used for rearing the young. Thus the plenty of some seasons is kept till famine times and then doled out from the full ants to the hungry ones, and the whole community is the better able to wait till the next good season for collecting honey. So greatly stretched are the bodies of the full ants that they seem like round berries, and they are dug out of the earthen home and eaten by man for the honey they hold.

Even yet more remarkable is the use of the home of certain ants as a garden for rearing food; this is done in special chambers underground, widely separated but connected by narrow tunnels. We speak of the "fungus-growing ants" of tropical America, of Mexico, of Texas, of Arizona and even of the Atlantic States as far up as New Jersey. Climbing the trees in vast numbers some of these ants may soon cut off all the leaves bit by bit and thus destroy the expected crops of fruits in man's gardens; these bits of leaves then carried along in processions waving over the ants' heads suggest the name "parasol ants" as well as "leaf-cutting ants." Why they took all this green stuff underground was long a puzzle, till it was proved that down in special chambers some of the smallest ants stayed at home to chew up the leaves into a pulp that was made into a bed, stuck to the ceiling, to be sure, but otherwise like a mushroom bed that man may make in a cave. On this compost bed there grows up a little fungus with microscopic edible knobs, called fungus "kohlrabi"; and these are eaten by old and young.

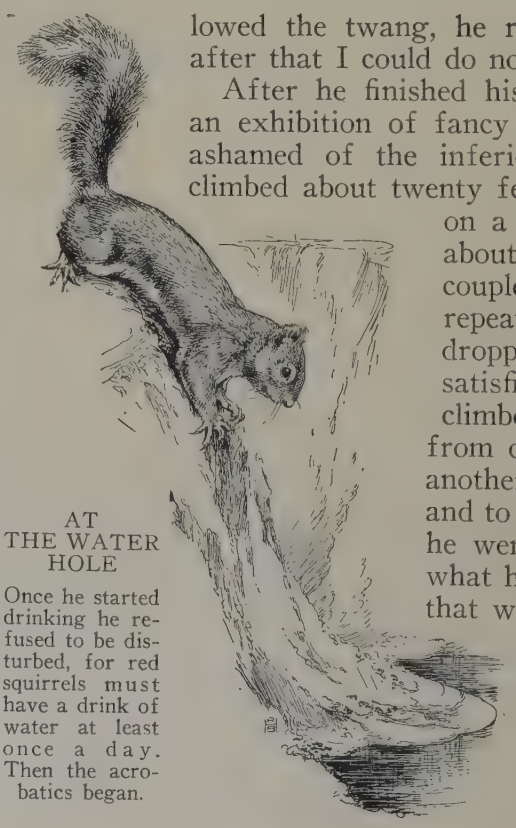
That these ants thus do some of the things that man does was made out by various students from direct observations in the field. But many even more phenomenal facts came from study of these fungus growers kept in artificial homes. So it was learned that the original home builder, the mother of the family, first digs down and makes a little room underground and there lives a most retired life for a month or so, with no food and no outside help, laying eggs and tending the young as they hatch. The big muscles that once moved her wings, being no longer of use when the wings are cast off, dissolve away and act like food to enable the mother to live and to lay many fine eggs. Meanwhile the mother is providing for the future welfare of the family by "cultivating her garden." But having no leaves, how is this possible? Briefly, the mother brings with her, as dowry, a pellet of fungus, concealed in a special part of the mouth, and this is the seed she plants and cares for, even eating some of her own eggs so that the fungus may thrive the better and be ready for the future family. When the eggs not eaten hatch out, the young ants find a little garden an inch or so in width and proceed to take care of it and gradually to relieve the mother of all cares except the laying of eggs. After a week or so, some of these youngsters dig out of their home to the surface of the earth and search out leaves with which to enlarge the garden as an ever-growing bank account upon which the whole family may flourish evermore.

Your ant is no lover of sunshine at all times but, though seeking food in the open, often runs home underground to rear its young in the dark, living like a honey bee a double life, now in sunshine and now in darkness. The dark home, however, may not be underground; many kinds of ants make their nest up in trees, digging out their passages inside the dead or the living substances of trees, or living inside thorns. Everyone has seen the ants swarming out of a broken old stump or log; and in cutting old trees one finds the carpenter ants in the very heart sleeping in great black masses the winter through in the midst of meandering tunnels they have slowly carved out of the hard wood. Even the old galls on oak trees may be taken possession of, by some ants, as comfortable homes after the original makers have left the galls hanging empty.

The Water Hole

By Robert Bruce Horsfall, Jr.

TODAY I had an interesting experience with a little Pine, or Western Red Squirrel. I saw him from my open window on the trunk of a tree about ten feet away. I leaned out and imitated his chirp as nearly as I could. Surprised, he scampered off and circled round in the trees until he reached the other side of the window; then he scrambled to the ground. During this time, as I kept on chirping, he moved forward jerkily, stopping frequently to listen and investigate, until he reached the base of the tree and looked at a hole about three feet square and two feet deep, which contained water. As he moved to the rim, I twanged on my bedspring. He jumped back to the tree, but as I continued to chirp intermittently he came back again and scrambled into the hole to get a drink, because red squirrels must have a drink of water every day. I repeated the twang, and he jumped out of the hole and scuttled to the tree, but, seeing that no harm followed the twang, he returned to the pool, and after that I could do nothing to disturb him.



AT THE WATER HOLE

Once he started drinking he refused to be disturbed, for red squirrels must have a drink of water at least once a day. Then the acrobatics began.

After he finished his drink he treated me to an exhibition of fancy acrobatics that made me ashamed of the inferior agility of man. He climbed about twenty feet up a tree, scuttled out on a limb, dropped to another about ten feet below, turning a couple of flips on the way and repeated the performance as he dropped to the ground, well satisfied with himself. He then climbed another tree and sprang from one of the upper limbs to another about twenty feet below and to one side, spinning over as he went till I began to wonder what had put such a "kick" into that water. However, he lit all right, and my fears were allayed. Tiring of stunts, he stopped again to investigate my chirp, and finally went off thoroughly disgusted.

The Gulls of Mono

By W. LEON DAWSON

GULLS are most naturally associated in the popular mind with sea coasts and inlets, or with such large inland bodies of water as the Great Lakes. There exist, however, three species which are decidedly mountaineers, as well as beach combers and surfmen. Of these the two foreigners, the brown-headed gull (*Larus brunneicephalus*) of central Asia and the Andean gull (*L. serranus*), have the advantage of our American species, because of the superior elevation of their breeding ranges; but our California gull (*L. californicus*) if a somewhat timid mountaineer, is, nevertheless, the highest ranging gull of our continent. On July 13, 1924, our museum party saw a bird on Lake George, in extreme southern Mono County, California, at an elevation of 9,200 feet; and later in the season the birds deploy over the Tioga Pass section of the central Sierras, where they undoubtedly reach an altitude of 11,000 feet.

So far as known, the most elevated breeding station of this species is Mono Lake, which lies on the eastern flank of the Sierra Nevada Mountains of California, and at a point almost due east of San Francisco. Mono Lake, at an altitude of about 6,400 feet, is an alkaline evaporating pan of some eighty-five square miles extent. Its waters are strongly impregnated with various salts—potash and sodium sulphate in the lead—and are, of course, unfit to drink. In spite of this mineral handicap, however, "small Branchipus-like Phyllopods," locally known as brine shrimps, infest the water in incredible numbers. These ghost-like creatures, so paper-thin that they appear more like discarded shrouds than living creatures, form the staple article of diet of several thousand California gulls, and of a large company, presumably nonbreeding, of Eared Grebes.

AN OUTPOST AT MONO

High in the Sierra Nevadas, these gulls live incredibly well and in numbers.

THEY MAKE THEIR HOMES ON THE LAVA ISLANDS OF MONO LAKE

Timid mountaineers, these gulls live at 6,400 feet of altitude, eating luxuriously of the brine shrimps, "the discarded shrouds," that fill the alkaline lake. They number thousands.

Midway in this lake rise two volcanic islands, one, the white one, Paoha, about two square miles in extent; and the red one, Negit, perhaps one-sixth as large. The latter lies to the northeast and is separated from its white sister by a channel several hundred yards wide. Upon the larger island, which is partly covered with desert vegetation, sage and atriplex, an intrepid pioneer has established a goat farm; but Negit is a mass of lava and cinders from which the fires seem scarcely to have died out. The northern portion of Paoha, also, is a tortured mass of lava, upon which not even goats could find sustenance. It is here, therefore, upon the northern peninsula of Paoha and the eastern portion of Negit, that the California gulls have established their chief nesting colonies.

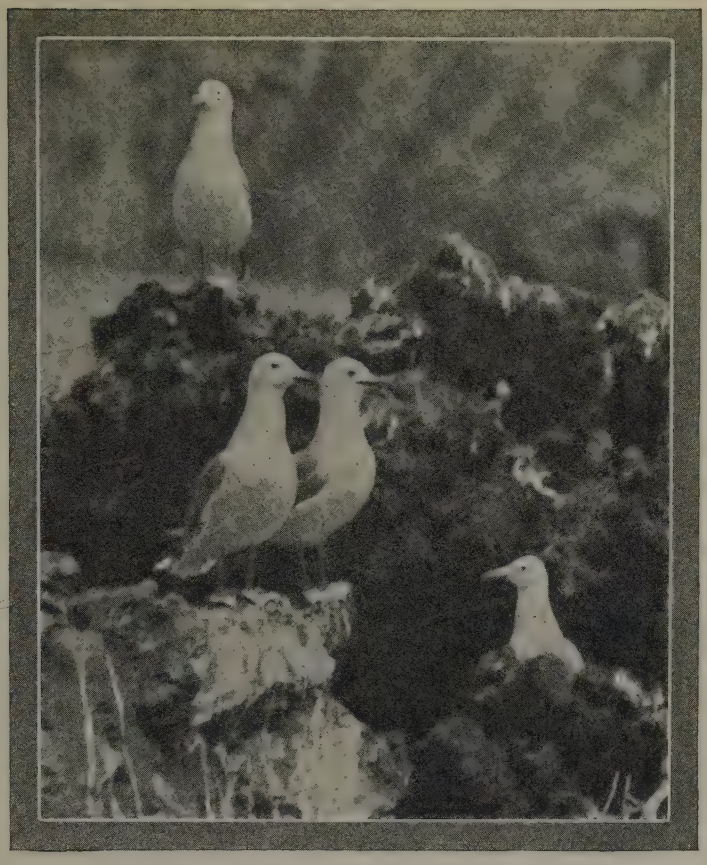
For the serious-minded student of animal behavior, as well as for the more casual bird lover, there is scarcely a more thrilling experience than that afforded by a visit to a colony of nesting gulls. If the incubation season is advanced, as it was at the time of our visit in June, 1919, the larine nerve is tense and the vocal protest is most mighty. Himself an unscrupulous marauder, the gull fears reprisal at whatever hands. No modesty or disguise of approach will allay the first fears. Everybody springs to arms. A shrieking chorus fills the air, and chaos reigns. But the gulls of Mono have not been mistreated, and passion soon subsides. Fear is measurably allayed when the visitor seats himself, camera in hand, and appears to be attending to some business of his own. The gulls settle watchfully, and the mother birds eye their eggs wistfully or take a step in the direction of their nests, and mark the effect upon the intruder. And as there is no confusion like the turmoil of a gull colony under attack, so there is no peace more beguiling than that of snowy forms which have yielded to the urge of maternal duty and have settled to the task of incubation. The sitting bird is at first both apologetic and defiant, but ere long the mystery of brooding motherhood softens the features and makes even the female gull, quarrelsome, shrewish, cruel, though before she may have been, a veritable-seeming dove of peace. Husbands stand

AT THE FIRST SIGN OF ALARM

"Everybody springs to arms. A shrieking chorus fills the air and chaos reigns."

protectingly by their mates on the nests; and those less involved neighbors, who glowered fiercely enough at the outset, yawn now or take themselves off to the fishing grounds.

Our judgment of birds, especially of colonizing birds, is formed oftenest on hurried visits, and amid confusion and tumult. Yet such judgment is most superficial and disproportioned. The only way one can really understand the birds is to live with them, quietly, unobtrusively, reassuringly, day after day. Only once in his liftime has the writer enjoyed such a privilege to the full; but that week, spent all alone upon an isolated rock in lower Puget Sound, where the Glaucous-winged Gulls nested, was most illuminating. The welter of sounds, which smote the ear as a meaningless babel during the first few hours, gradually died down. The confusion of distraught hoverings gave way to orderly, significant movement. Deeper and deeper glimpses of the mentality of the birds were afforded; and, above all, the vocal expressions of the birds began to take on meaning. Of course, bird sounds never rise to the dignity of language, but they do accurately voice the emotions; and these emotions are more complex and varied than the casual student would suspect. There is, without doubt, a generic similarity in the emotional expressions of all the larger species of gulls; and a comparative philology, patiently worked out, would be fully as instructive as a comparative study of plumages or of any other external feature.



ONE PAIR WE DUBBED THE LOVERS

Some of the birds lived happily while others seemed to bicker constantly.

Three riotous hours spent on Negit stand out as among the most vivid of all experiences with nesting water fowl. The gulls, to the number, perhaps, of a thousand pairs, had colonized on the extreme eastern tip of the island, where they could at least call across to their neighbors on Paoha. The lower slopes of the lava had been smoothed by water action, and a scanty vegetation, especially of sage bushes, had sprung up. The birds made their nests anywhere—in a hollow of lava, in the spaces between rounded stones, or under the shadow of sage bushes, but always, of course, on the ground. Although the eggs were planted so thickly that one had to pick his way about with care, it was noticeable that the distance between any two nests was more than that which could be bridged by two craning necks, each surmounted by a pair of hostile nippers. The gulls are very distrustful of each other, and for the best of reasons, because they are outrageous cannibals so far as eggs are concerned. Indeed, it is passing strange that a gregarious species should exhibit such a deep-seated hostility towards its own kind. The "social contract" with them is merely an armed truce, and in a sturdy beak and a deft wing lie their only assurances of survival. One pair we dubbed "the lovers," for they appeared to be inseparable. Others exhibited the greatest tenderness in the treatment of their mates or of their offspring, while others still bickered or "crabbed" until the nuptial bonds seemed upon the verge of dissolution.

This reminds us that a *species* of birds is to be regarded much as a race, or at least as a tribe, of men might be. It is safe to make certain racial generalizations: to say that the Chinese are industrious, or a certain tribe of negroes indolent. But a given Chinese may be a loafer, and the medicine man of the indolent tribe may be a man of tireless industry. In like manner, with the birds, the temptation is all too prevalent to exalt the characteristics of a given individual to racial rank, or to generalize from the conduct of one particular group. The truth is that a bird species includes an enormous range of individuality; and it is the consideration of individuals, not races, which gives zest to bird study.

PHOTOGRAPH INTERNATIONAL NEWSREEL

A REMARKABLE GROUP OF FLAMINGO IMMIGRANTS TO ENGLAND

One of the largest single flocks shipped in captivity. They were brought from Gaza, Egypt, and, on arriving in England, they were met by a wing-clipper. They are shown here gathered together before being shipped to various parks and owners of private collections. These birds are European flamingos and are related to the storks. They are rapidly vanishing owing to their persecution at the hands of man.

PHOTOGRAPH BY MARTIN JOHNSON

THE WHITE-TAILED MONKEY OF EAST AND CENTRAL AFRICA

This member of the monkey family is usually found at altitudes of 6,000 feet or more. It rarely descends from the trees and seeks densely wooded sections. Frequently one of these monkeys will start a peculiar croaking sound which will be caught up by others and passed along for long distances. It belongs to the genus Colobus, a group which furnishes much of the popular monkey fur for the dictates of feminine fashions.

PHOTO INTERNATIONAL NEWSREEL

FUR SEAL FAMILIES IN MASS FORMATION

At the height of the breeding season the rookeries become so crowded that the bulls have difficulty in guarding their harems, and as the days go by many battles for possession are fought.

Fur Seals of the Pribilof Islands

By EDWARD A. PREBLE

WHEN MILADY draws about her shoulders her warm cloak of seal skin, to shut out the cold wind, how often does she give a thought to its original wearer. Does she think of the ice-laden waters of Bering Sea dashing against the rock-bound shores of those islands which are its home. Probably not, yet nine-tenths of all the seal-skins now used come from two small islets of the Pribilof group which form the only land on which the fur seal ever sets foot. And in the rigors of that clime have been developed the qualities which make its skin so serviceable.

Anent the fur seal and its home, there has evolved a strange and incongruous nomenclature. The male of breeding age is called a bull, the female is a cow, but the young is a pup! The breeding bull with his assemblage of cows constitute a harem, and their place of abode is a rookery. The immature males are called bachelors, and their resort on land is a hauling ground. Yet, however inapt this terminology at first appears, the observer soon becomes accustomed to it, and its incongruity is forgotten.

The fur seal is not an intelligent animal, and therefore has learned nothing from his many generations of sad experience with man. Each year he returns with his fellows to the islands where several hundred people exist by preying upon him. When it is desired he gathers with his companions in bands of the proper age, and allows himself to be driven overland to the slaughtering ground. Here he presents himself for close inspection, and holds his tender head aloft to receive the fatal blow. If rejected and encouraged to escape to the sea he makes every effort to rejoin his companions who are being slaughtered. In short he does his best to serve man's interests, giving all and asking nothing.

The Pribilof group includes five small volcanic islands set in the midst of Bering Sea. The two larger are St. Paul and St. George, the principal sea islands. The next in size is Otter Island, while Walrus Island and Sea Lion Rock are scarcely more than reefs.

The three larger islands, though supporting no tree growth, and only the lowest of creeping shrubs, are thickly clothed with herbaceous vegetation, the moist and comparatively warm summers inducing a growth which brings to mind the luxuriance of the

tropics. Owing to the peculiarities of the climate these plants have a long flowering season. In consequence large fields of blossoming lupines, saxifrages, Arctic poppies, and other plants of great beauty are found throughout the summer.

These islands have changed but little in the scant one hundred and fifty years that they have been known to civilized, or uncivilized, man. With no trees to be cut, and with agriculture impossible, man has wrought but few changes. A couple of small villages and a few roads and trails have been built. Otherwise the islands appear to the birds and seals exactly as they did when man first appeared, and for many centuries before.

The flowers of the summer season have been alluded to, but the summer is short. Its close ushers in a season when fierce gales, snow laden, lash the sea to foam, and sweep over the hills and plains of these islets with a fury almost irresistible. Then most of the birds and animals leave for more pleasant climes and winter rules land and sea.

But at last comes spring. The snow is gone except for the drifts in hollows and on the lee side of the hills, and the icy walls on the shores are weakened and broken in places. Then up from the south come the earliest of the fur seals, the strongest bulls, great sleek warm-coated fellows, full of energy and vain of their strength. Straight for the land they come, and climbing upon the rocky shore each seeks the place where last year he made his home. If the season has been normally severe, and if his station be favorable for ice accumulation, it may happen that a coating of ice many feet in thickness still covers his favorite position. Whether this be so or not there he takes his stand and begins his ceaseless three-month vigil, to be spent without food, almost without drink, and without sleep, save what brief snatches he may catch in the unending clamor and incessant activity of harem life.

From time to time, other bulls arrive, each seeking a station. In the year that has passed since the last breeding season thousands of young males have reached the age and size which enables them to compete with the beach masters. So each station must be defended and held by force, or lost, for to each bull seal finally comes the time when he must retreat before a younger and stronger rival. So as the days go by many battles are fought. In the meantime, from early June on, the prospective mother seals arrive from the south. They land with little delay, though somewhat timidly, and each soon selects her lord and master. Jealousy is not a characteristic of the female seal, consequently a rapidly growing harem is more likely to gain recruits than a small one. For this and other reasons the harems vary greatly in size; some may contain only a few females, while others, apparently no better situated, may number several score. Once a female has selected her home, the male under whose care she has placed herself resists with all his might any defection. Each harem master must be continually on the alert to keep his wives from straying away, and to prevent their theft by other bulls, either already established or seeking stations. At any moment the lord of the harem must be prepared to make a rush to overtake a cow which seems inclined to wander. She is seized by the neck or back and unceremoniously tossed back

PHOTO BUREAU FISHERIES

A HERD OF BACHELOR SEALS

Having little else to do, the bachelors spend much of their time in sleep at their land resort called a hauling ground.

PHOTO INTERNATIONAL NEWSREEL

A SMALL BUT HAPPY FAMILY

This shows well the comparative size of the father and mother seal, and the new-born pup. Each mother seal gives birth to but a single pup, coal black and weighing about twelve pounds.

among her sisters. At the same time perhaps another male which has been watching his chance attempts to usurp the place of the legitimate owner. *He* must be driven away, or all is lost. So the days and nights are filled with action.

Each female gives birth to a single pup soon after she comes ashore—sometimes within a few hours. This little fellow is coal black all over and weighs about twelve pounds. Within a day or two after the birth of her pup the female is free to go and come as she wishes. Then she begins a series of trips to the feeding grounds off shore. These may be many miles away, but distance means little to an animal able to make a journey of several thousand miles twice a year. On the fishing banks the mother seal eats enormously, and having remained at sea a day or two to digest her feast she returns to her home and nurses her hungry offspring. How a mother can pick out her own dusky youngster from among the thousands that soon throng the rookeries no one else knows, but this she does. Unlucky the pup whose mother has been intercepted and devoured by the killer whale, her worst enemy, unless indeed such an orphan be adopted by some mother bereft of her own pup by death. In the trampling that these little fellows must undergo in the fights which constantly occur, and the everlasting mad scrambling, many lose their lives.

Nourished by the abundance of rich milk periodically furnished, the pups grow rapidly, and as they gain in strength and activity they wander back and forth along the beaches, alternately playing with their companions and sleeping. About the beginning of August the older pups, now nearly two months old, begin to venture into the water, and soon become proficient swimmers. By late August they are able to brave the roughest water and spend hours playing in the surf, extending their excursions so far from their nurseries that one wonders how the mother seals continue to find their own. Long

after the breeding bulls have left the islands the mothers must still attend their pups, for it is not until November that they are sufficiently developed to go to sea with the older animals.

When they leave the islands the seals travel southward, leaving Bering Sea by the same routes that they have followed for ages. Except at the breeding season they are independent of the land; at sea they find their food; on its surface they sleep in comfort. So southward they leisurely make their way, some reaching the latitude of southern California. The bulls and the older of the bachelors winter mainly not far south of the Aleutian Chain and in the Gulf of Alaska, the younger males go farther south, while the cows go the farthest of all. On the northward migration the old males arrive first, the bachelors and cows next, two-year-olds later, while the yearlings, grown longer and slimmer, but weighing no more than they did the previous autumn, do not reach the islands until late in August.

PHOTO BUREAU FISHERIES

HOMES OF THE NATIVE ALEUTS

In place of the underground hovels of the old days we find the natives living contentedly in comfortable frame houses.

PHOTO INTERNATIONAL NEWSREEL

BULL SEAL AWAITING HIS FAMILY

Up from the south come the earliest of the fur seals, the strongest bulls, great sleek warm-coated fellows, full of energy, and vain of their strength.

The growing scarcity of another sea-born fur-bearer, the sea otter, the owner of the softest and most valuable fur the world has ever known, was responsible for the discovery of the Pribilof Islands. It was toward the close of the seventeenth century that the sea otter was discovered by the Russians on the coast of Kamchatka. It was pursued relentlessly by its discoverers and those who followed them, and within less than fifty years it had become so scarce that the fur gatherers had to extend their explorations in search of fresh fields. In 1741 the surviving companions of the ill-fated Bering brought back a large catch both of sea otter and seals from the Commander Islands. This new field and the Aleutian Islands, next to be exploited, were well-nigh exhausted within the next thirty years and then it was that the numerous companies began to be interested in the fur-seals.

During these years, while the wealth of the Aleutians was being so ruthlessly wasted, the attention of the Russian fur-hunters was attracted to the vast numbers of fur seals which rushed northward each spring through the passes of the Aleutians, and in the autumn passed southward. Questioning brought

out the fact that the natives knew nothing more of the seals than this. But since the animals never landed on these stormy shores, it was naturally supposed that they must repair to some unknown land to the northward to breed, and perhaps to some other continent to the southward to winter. Many voyages of search were made in both directions, but it was not until 1786 that Gehrman Pribilov, blundering about in the impenetrable fog in a small sloop, the *St. George,* almost wrecked his vessel on the high cliffs of an island where the clangor of thousands of seals told him that his long search was ended.

It was a year later that the other larger island, St. Paul, was found. Although no record exists of any previous visit, tradition has it that the remains of a fire were found on the beach of St. Paul when these hardy navigators first landed there. Who those first discoverers were will never be known. Probably they were lost while endeavoring to make their way back home. At any rate our greedy fur-hunters asked no questions. What most interested them were the immense herds of seals congregated on the beaches. Unvexed by any land enemy their thronging thousands covered the rocks and sands in dozens of communities which stretched beyond the range of the eye.

But these teeming hordes were not long left in peace. From the Aleutians, where the Russians already held the natives in virtual slavery, recruits were brought to the Pribilofs and established in several small villages for the labor of skinning the seals. Here the natives, living in half underground huts which they heated as best they could with the scanty supply of damp driftwood and seal fat, driven and abused by their Russian masters, lived and died and were forgotten.

During the first fifty years of Russian rule on the Pribilofs, male and female seals were slaughtered indiscriminately, but later the killing of females was abandoned, and in 1867, when the United States bought Alaska, the herd was variously estimated at from two to five millions.

For about forty years following the right to take the seals was awarded to private companies. The development of pelagic sealing, however, the killing of seals at sea, an extremely wasteful and brutal method, resulted in 1911 in the negotiation of a treaty with Great Britain, Russia, and Japan abolishing pelagic sealing for a period of fifteen years. This treaty is effective until 1926, and it is expected and hoped, in view of the manifest advantages gained by the cessation of this wasteful practice, that it will be further continued.

Since 1912, yearly seal estimates have been made. The count of pups has shown an annual increase in that class of between nine and ten per cent. The seals taken for their skins are all three-year-old males, since it is at this age that the pelage is most valuable, but the herd is a growing valuable resource.

A Problem in Parrakeets

MEMBERS of the American Nature Association may be able to make suggestions that will be of assistance to a fellow-member, the Marquis of Tavistock, Warblington House, Havant, Hants, England. He presents a problem, steps for the solution of which have already been taken by the association, but other ideas may be valuable.

The Marquis of Tavistock writes that for many years he has kept and bred species of rare parrakeets. These are mostly Australasian, and he is particularly anxious to breed in confinement certain species threatened with extinction at no distant date. He says that he has failed to interest Australians in this, and has found himself hampered by the fact that all the vanishing species are only half hardy in the English climate, and do not breed in confinement there.

"American naturalists," the Marquis writes, "are so keen and enterprising in the protection of their own native fauna that I am encouraged to think that people might be found in the United States willing to concern themselves with the artificial preservation of foreign birds of great beauty and scientific interest. The experiment would cost money, though not an enormous sum. Each pair of birds would have to be kept in a movable aviary of the right type, erected in a district favored with a genial climate. The stock would have to be managed not in a slipshod way usually considered sufficient for foreign birds, but with the care and method commonly bestowed on pedigreed domestic animals.

"I am prepared to give the birds, together with the fullest particulars as to management, which should insure success in breeding. My only condition would be that my advice should be carefully observed and warnings as to wrong treatment not ignored. For a start I would suggest that an experiment be made with the Tasmanian Blue-winged Grass Parrakeet, a little bird of extreme beauty and apparently rapidly disappearing. If the experiment with Blue-wings were successful a start might perhaps be made with Bourke's Parrakeet, the Turquoisoine Parrakeet, Red-capped Parrakeet. I have pairs of all of these but hardly a breeding stock as yet."

LEFT
"The plant grows in rank jungles, killing out everything."

BELOW
"When it is a foot high the top is brittle and can be snapped off with the fingers."

Wa-ra-be, a Friend by the Wayside

By EL COMANCHO

EVERYBODY in the west who knows anything at all about the outdoors knows the ordinary Brake Fern, common from California to Alaska and from the Rocky Mountains to the coast and growing, more or less plentifully, in several other sections of the United States and Canada.

In the wooded northwest coastal section the plant grows in rank jungles killing out everything under it if allowed to take the soil and fighting the plow for years before it finally gives up under the usages of cultivation.

To botany it is known as Bracken, with the Latin name of *Pteridium aquilinum pubescens* (Piper), or *Pteris aquilina,* var. lanuginosa (Henshaw).

To the farmer it is known as Fern or Brake or Bracken and is considered one of the worst weeds he has to contend with, for, if a piece of the creeping, underground root-stalk is left alive under the soil, it will send up a leaf-stalk for light and air and then begin to grow in as many different directions as it can, creeping to every point of the compass and sending out side branches and rebranching from these again until these roots will be so interlaced that they resemble a fish net—and it only takes one season to do it!

It is one of the rapid workers in the plant world and it makes a regular forest of stems which interlace into a green roof of leaves. These completely shade the ground and deprive all other vegetation of light, air and moisture, and it is greedy for all these.

The root-stalks will go down through a solid clay bank ten or fifteen feet for water, if they have to, though they prefer to keep at a level of eighteen inches to two feet below the surface where they form a thick mat of twisted runners the size of one's thumb and so stout that it is almost impossible to run a plow through them where they are close enough to the surface.

Grading crews, doing highway or railroad grading work, find it one of the sources of vexation and trouble for they must plow through and break up

the interlaced roots before they can get into the solid ground. Blasting with dynamite merely blows a hole in the root mass but leaves the roots behind!

The plant does not grow thickly in the heavy timber but the roots are there ready for business, and it springs up in a thick jungle immediately after logging operations are concluded which let sunshine, air and moisture down to the ground previously shaded by the heavy forest trees. It only takes one season for it to take over the newly logged country unless fire in the slashings is allowed to run after the loggers are through. In that case it takes two, or even three years for the bracken to drive out the fireweeds and smother everything else so it can cover the old stumps and logs with its own canopy of green.

Stock will not eat it at any stage of growth; it does not produce a seed that any bird or animal can eat; it is a source of danger as soon as it withers because it burns like tinder when dry and will carry fire into the woods if it starts.

The plant is an outcast well hated by everybody who knows it and comes in contact with it; it destroys good pastures, overruns fields, fights everything and everybody all the time, takes all it can get of good soil and moisture, fills good ground with a mass of tough, long-lived roots almost impossible to get rid of, stands pat wherever you find it and it gives nothing back.

It remains for the little brown Japanese to beat this plant at its own game and make it pay back a little for the many evil things it does; he evens the score by eating it!

Ask any intelligent Japanese if he knows what "Wa-ra-be" is, and he will immediately close his eyes in a satisfied Oriental grin and tell you all about it and how they make use of it in Japan.

You find that the Japanese vegetable man goes to the woods and pastures, or to the waste ground along the highway, or even into the vacant lot next door, when the bracken stems are shooting up out of the ground in the spring.

Each stem, as it comes up, has a tightly curled top that bears a very marked resemblance to a chicken's foot when the toes are all tightly drawn together into a chicken "fist," if the term is allowable.

For the first six inches or one foot of its growth this stem, which is the future leaf-stalk, is exceedingly tender and very brittle so it can be snapped off with the fingers two or three inches below the curled top; later this stem hardens and becomes very fibrous and almost as hard to break as whalebone.

While it is in the tender stage with the top not more than a foot above the ground is the growth stage when the vegetable man snaps its head off, dropping the curled, tender stalk-end into his basket.

Soon he has a basketful of tightly curled, woolly, brown stem-tops and these he carries off to the market where his countrymen soon find it displayed for sale under the Nipponese name of "Wa-ra-be," a spring plant to be used in salads and in other ways.

When the cook gets it he dumps it into a vessel, covers it with water and throws in a quart or so of wood ashes and lets it soak for twenty-four to thirty-six hours. When it has gone through this soaking process the natural tannic acid content has been extracted by the wood-ash solution.

It is now removed from the soak-water and thoroughly washed through several changes of water, or left in running water for half an hour to remove the free tannic acid and the wood-ash lye and it is ready for use. If you taste it in the raw stage you will find it has a flavor almost exactly like almond nuts, so it is good and appeals to the taste of a white man as well as anyone.

The cook now chops it up fine and puts it into a vegetable salad, with salad dressing and all the rest, and it becomes "Wa-ra-be salad." He may take part of it and put it in with a mess of spinach to which it imparts an almond-like flavor.

What Nature Story Does Your Camera Tell?

Photographs are coming in for the Amateur Nature Photographer's Page announced in the September issue of NATURE MAGAZINE. The winning photograph and others will be printed in the November issue.

Send in your photograph now for the December contest. Look through your films for a real Nature photograph that will reproduce well or go out and snap a new one.

Photographs for the December contest must be mailed to reach this office by the fifteenth of October. A year's membership in the American Nature Association will be awarded for the best photograph. This will go to the successful contestant or may be given to a friend.

Photographs to be returned should be accompanied by a stamped, self-addressed envelope. Mail your Nature photographs to Photograph Editor, NATURE MAGAZINE, 1214 Sixteenth St. N.W., Washington, D. C.

Arkansas' Romance Reforestation

By WILLIAM L. HALL

A GREAT romance unfolds in southern Arkansas—a romance of Nature and man, forest and farm, pine trees and cotton. It involves long conflict between a natural tendency and a human ambition, and ends at last in reconciliation, understanding, and in man's adjustment to the natural law with which he has been in conflict.

One who has followed the widening discussion of reforestation in the south during the past five years must have noted here and there deep creative thought, thought that crystallizes into plans and action. In scattered instances something worth while in reforestation has been undertaken. Nature is being given a chance to restore her forests.

It has long been recognized that southern Arkansas affords most favorable conditions for the growth of pine trees. Here, indeed, they grow as if by magic. Pass along a road today, and there a field is in cotton. Come along tomorrow, or, to be exact, two or three years later, and that field is fully set with pine trees. Little fellows a foot or two high and ready to grow two feet a year. From the viewpoint of the farmer a most dismaying sight. He doesn't love those pine trees that so quickly steal in on his land.

What a battle has been fought with those pine trees. A hundred years ago they stood in solid formation covering ridge and flat. For ages untold they had been there. When a veteran fell by fire or wind, younger pines quickly raised their crowns in the new-found light to fill its place. Nature was at rest; all her forces in balance.

Then came man, white man; the changer, the destroyer, the producer of new things, the constructor of new systems. What was a pine forest to him? A menace, a hindrance! Do away with it, cut it, burn it. Here was land suited to the building of homes, to growing cotton, corn and sweet potatoes. So he cut and hewed and sawed and burned, with all his might. Such were the ideas and so were directed the zeal and energies of the pioneer of this region, green with pines a hundred years ago. So it was with his sons sixty years ago and so with his grandsons thirty years ago. For this battle fought through three generations was not won by man. Finally the aggressor was worn down and worn out.

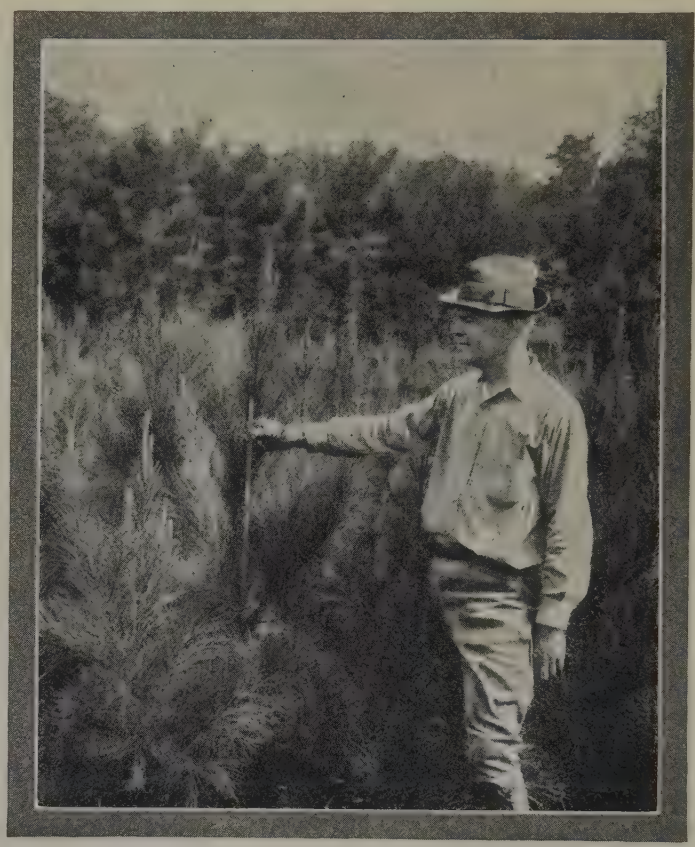
Why? Because, for one thing, he did not know the tremendous vitality of the pine forest. Beat it back in his activity he could; obliterate it he could not. Ever and always its pressure was upon him. Silently but with persistence of gravity it stole back into fence rows, roadsides, idle fields, orchards, even into graveyards of its mortal enemy, man. Then another thing, in the third generation of this warfare there began to be value in this very crop that for so long had been despised and rejected. A travesty indeed on the foresight and judgment of men that, after seventy-five years of active warfare against the pines, it transpired that the greatest value of many of the south Arkansas farms was in the remnants of pine stands that had not been destroyed or else in the second growth that had come up on abandoned fields and pastures.

It is from these largely that the great timber holdings of the

THE SHORTLEAF PINE IS NATURE'S PRODIGY

This is a glimpse of virgin timber, a growth that is found on some 400,000 acres of the Dierks holdings.

present day have been built up. This consolidation of timber tracts by the absorption of abandoned or low value farms has been going on for thirty years, and it continues today. While it is being resisted somewhat, the resistance is mostly academic. The real movement is towards timber. More fields are being abandoned every year, and but little land is being cleared. Go through the byways of southern Arkansas and you will find thousands of stands of young timber on fields in cultivation from five to fifty years ago. You will find thousands of home sites once occupied now unused. Some of the houses still stand; others are gone. They all represent defeats. Here families lost out in their struggle to win a livelihood. Generally the lands went to the lumber companies.



PINES QUICKLY COVER THE FIELDS

In the background is a ten-year-old stand, and in the foreground five-year-old trees.

Timber owners in absorbing such lands were placed in a position where they easily could have taken advantage of Nature's powerful aid. But it can be said of the first generation of lumbermen that it worked against Nature as much as did the farmers before it. Closing his eyes to the growth possibilities of the pine, the lumberman generally did the greatest possible damage to the timber. Expecting to go over the land but once, he took every tree that would make a six-inch log.

Then fires came. The lands burned over and over again. Under such treatment the white pine forests of the lake states were obliterated. Not so the shortleaf pine forests of this region. They took all that punishment and came through the ordeal. The lumberman could not obliterate them any more than could the farmers. It appears to be the fixed purpose of Nature that man is not to do away with this tree in this region. He is to utilize it instead.

Come and study the shortleaf pine and you will quickly see its powerful and dominating hold upon Nature. Note first its seeding. Instead of seeding at intervals of several years as do some of the pines, it seeds almost every year, and occasionally its crops are heavy. Germinating freely, it springs into vigorous growth. It reaches a height of four to eight inches the first year. The next year it does better if it is not caught by fire, and thereafter, if conditions are favorable, it may average two feet a year for twenty-five or thirty years.

But in the past not one tree in ten thousand has made uninterrupted growth. Fire always comes; usually it comes many times. What then? Well, generally the little tree is killed back, but it does not die. Up it comes again, sprouting from the root. It grows faster than it did at first because of its superior root development. Over and over this may be repeated. I have observed trees that have been killed back four or five times and perhaps lost twenty years in getting started. Finally, by some kindly fate they escape fire for a few years and get too big to be killed. Thereafter, their foliage may be singed off and their trunks blackened, but they keep on growing. Fire continually buffets them. It burns into their trunks. It burns the leaf cover off slick and clean and dries out the soil and sets back the growth, and, of course, some trees it kills. But, somehow, the stands persist and generally come through to size for cutting.

Shortleaf pine in this region appears to have no other serious enemy. Drought has little effect on it. In the long drought of this year, when blackberries dried up in the fence rows and corn turned ashen green and withered in many fields, I found not one pine dead from drought. Instead, roadside and old field seedlings had commonly by July 1 made a growth of two to three feet.

And hogs! Hogs are no hindrance at all. They are a help. They cultivate the soil. They mix soil and leaf litter together so that fire does not get so hot or burn so fast. Let us have more hogs in the shortleaf woods.

It has taken lumbermen a long time to realize that in this tree they had anything more than possibilities of a single crop. Old field growth that came

to merchantable size did not convince them. They had to see their own cutover lands grow up again and produce a second crop of merchantable timber. And that very demonstration Nature has given not once but in many cases. In spite of destructive logging in the first place, in spite of almost annual burning, that demonstration has been given.

LETTING THE LIGHT INTO THE TIMBER

Old field stands are thinned out more to provide good conditions for growth than for what they will yield now.

Recognition that crops of pine timber can be grown and harvested in perpetuity is now rather common among lumbermen of this region. A considerable number of them are gradually shaping plans for continuous operation on this basis. They are aggressively buying second growth lands and consolidating their holdings. Two leading companies have announced definite plans of permanent operation based on the continuous production of timber crops. The first of these was the Crossett Lumber Co. of Crossett, which some two years ago started upon this basis. It has for a quarter century been accumulating holdings of virgin- and second-growth timber and probably for several years has had in mind the possibilities of permanent operation.

Now comes the largest company of the region and announces plans of permanent operation of its industries based on reforestation of its entire holdings. This is the Dierks Lumber and Coal Company of Kansas City.

The operation of this company in Arkansas dates back to 1900, when it acquired a small sawmill and a considerable tract of timberland at DeQueen. From this beginning, steady and rapid development has taken place. The little plant at DeQueen soon passed. There have grown up instead three major operations located respectively at Broken Bow and Wright City, Oklahoma, and at Dierks, Arkansas. An important railroad system owned by the same interests connects these plants with the Kansas City Southern at DeQueen. At DeQueen and Hot Springs the company has also large planing mills.

Each of the major operations involves a complete plant for the manufacture and refinement of lumber and represents high standards of equipment and processes. Here one sees the unusual sight of all lumber being stored in sheds. Except for a small amount of lowest grades, there is no open yard. All other stock is kiln-dried and kept constantly under cover. Highest quality of product is the aim. Mill waste is reduced by the manufacture of useful articles from small pieces of wood. Waste not used otherwise goes into the making of power which is supplied to a dozen or so nearby towns.

The plants themselves are the products of careful planning and engineering construction. Each plant is the center of a thriving town which was a wilderness before the plant was built.

Such manufacturing facilities could not stand alone. They must have the support of an adequate timber policy. That is basic. The Dierks timber policy shows steady expansion during the past quarter century. Its few thousand acres acquired in 1900 have grown to present holdings of 900,000 acres. All conditions are represented, from cutover lands badly fire damaged through various stages of second growth to finest quality of virgin timber.

Now while the decision of the company to make permanent its industries in this region through the practice of forestry and the growing of successive timber crops was reached only a few months ago, the whole course of its development has been towards this decision. Its land policy, its great manufacturing facilities, the fine little cities that depend upon its industries, its intimate connection with these and other towns through the supply of power developed from wood waste, its extensive railroad development in this territory have all made the Dierks interests part of the bone and tissue of this region. To pull out those interests would mean dismemberment and paralysis to a very considerable district. To keep on involves perpetuating the timber supply. What other decision could have been made than to adopt, as a working policy, reforestation? Any other course was to court ruin.

The decision was made effective in the early part of 1925 through restricting the cut in all logging operations. Trees under twelve or fourteen inches diameter breast high were left standing. With that as a beginning constant effort has been made to improve the procedure and to train the woods force for the most intelligent work in dealing with each acre as it is cut over. Much progress has already been made. The diameter limit prevails only in an indefinite way. Trees left standing are thrifty, fine specimens, and, if needed, they are left even if fifteen or sixteen inches. On the other hand, defective ones are cut to the lowest merchantable size. The company doesn't want any cripples in the next stand. Old field stands are thinned out to suit their growth requirements rather than for what they might yield now. Dead trees and snags are felled.

A knotty and daily problem arises in the protection of young trees of all sizes. The woods force is subject to much change, and new men coming into the work know nothing of the company's plans nor do they have the slightest trace of regard for a small tree. It is a matter of constant vigilance on the part of foremen, inspectors, scalers and bosses that the young trees are not damaged, either in the blazing of cutting strips, the felling of trees, the hauling of logs, or ruthlessly in any way. So far as possible, young trees must be left in perfect condition, tops and bark unbroken. Not much would come of this if the bosses and inspectors were an ineffective lot. Just give these fellows a clear idea of what you want and you will take off your hat to them for the results they get.

Then the brush. That is a problem, too, as always. The plan here is an elastic one. In the thicker stands of young growth tops are lopped and the brush carefully piled. Piling brush seems to clear the ground up so that a fire might be controlled by an effective crew of fighters. Where young stands are not dense other methods that are believed to be effective are in use. Brush work is handled by a special crew which, in fact, becomes a sort of utility crew. Their main work is with brush, but in times of shortage they may be put to log cutting, and in case of fire they are among the first crews called out.

In thinking of the fire risk one is apt to misjudge the situation unless he constantly remembers the hardy resistance of these shortleaf pine trees to fire. After examining hundreds of thousands of acres I recall no spot completely devastated except where all merchantable trees down to the smallest size were cut and then fires came at the worst times. Over and over I have seen trees eight to twelve inches in diameter come through hot slash fires with blackened bark and singed foliage, but not killed. Fire, while a great hindrance, is not the dread enemy it is in many other regions.

A carefully planned and supervised fire protection system, however, is to be the bulwark of the Dierks reforestation undertaking. For its main areas there will be a warden system, each warden having oversight of fifteen to twenty thousand acres. He will become an active agent in educating his neighbors as to fire damage and as to the possibilities of timber growing. A head fire warden is organizing the system and will supervise it.

For the logging areas and those recently logged a special plan will be in effect. Every man is on duty to stop any fire he sees. If he can't stop it himself, he is to report it to the nearest boss or inspector, who will put on it any nearby men at work. If an entire crew must be called out, either the brush crew or section crew will go, whichever is nearest. They are to be the first-line men in fire fighting. If reserves are needed, the steel gang will go next. This is a bunch of fifteen to twenty brawny men always engaged in track laying and with a locomotive always at hand. Under this plan as many as forty or fifty men can be put on a fire in an hour or two without stopping the necessary work of log cutting and transportation.

The Dierks Company moves out upon its new program cognizant that it is lining up on the side of Nature rather than against her. If men have fought Nature and failed, it will work with her and try to succeed. If Nature wants to produce pine trees here, the company will give her a chance. It will go further than that. It will, so far as possible, remove every obstacle and give her every possible aid. Furthermore, it will so manufacture the trees into lumber and other products that waste will be reduced to the lowest limit. It will endeavor to so merchandize the products and handle the business generally that the communities depending upon its industries may have continued prosperity and growth.

And so the romance comes to its final stage by Nature having her way and by man's undertaking to work with her in the accomplishment of a great purpose—the reforestation of a region permanently adapted to a rich reproduction of pine trees.

Chill winter is coming in the North. Snow is not far away. Birds wing their way to the South. Next month R. Bruce Horsfall's colored painting pictures this annual epic and Ben Hur Lampman tells the story.

The Sun's Trip Through Space

By ISABEL M. LEWIS

THE SUN is a great traveler. As one of the many million stars in the heavens, different in our eyes only because so near to us, it is embarked on a journey the beginning of which is one of the mysteries of the past and the ending one of the uncertainties of the future.

This trip of the sun through space—in which it is accompanied, of course, by all of its planet family, including the earth—is a strictly no-stop flight. There are no delays, no mishaps, no jolts or jars but a steady uniform advance through the universe at the rate of twelve and a half miles a second. As all the stars are likewise in motion, in various directions and at various speeds not differing greatly, in general, from that at which the sun is moving, one may wonder how it is that the constellations have persisted in their present form for so many upon many centuries.

Hold over the head with top toward North.

The fanciful figures that man pictured in the heavens; the mythological heroes of antiquity; the strange animals, crosses, crowns, dippers and other varied objects appear to the naked eye just as they did several thousand years ago. This is in spite of the fact that all the stars have been moving ceaselessly at the rate of a number of miles a second in different directions.

Twelve and a half miles a second according to earthly standards is speed. When one remembers, however, that the nearest star, Alpha Centauri, is twenty-six *million* million miles away, it can be easily calculated that it would take about seventy thousand years for the sun to reach Alpha Centauri at the rate it is moving even if that star should obligingly stand still instead of continuing on its own jaunt through the universe.

A little picture of the solar surroundings on a greatly reduced scale may be helpful in understanding why the relative positions of the stars may appear the same for centuries even though each star is in constant motion. Let us imagine a miniature solar system in which the distance from earth to sun of 93,000,000 miles is only one inch. On this scale the solar system would measure only a little over five feet across the orbit of Neptune, the outermost planet. A miniature sun, moving at the rate of twelve and a half miles a second, or four astronomical units a year, would be displaced from its position only four inches a year on this scale. The nearest star, on the same scale, would have to be placed four and one third miles from this small solar system. Sirius, another close neighbor of ours and the brightest star, would be nearly nine miles away. Vega, that beautiful bluish-white star in Lyra, which is now in the northwestern heavens, and which lies in the general direction in which the sun is moving would be forty miles away, the North Star two hundred miles away, the magnificent Rigel in Orion six hundred and

fifty miles away. All of these stars are comparatively near the solar system.

If we considered such objects as the Great Hercules Cluster, the Magellanic Clouds and the Great Andromeda Nebula, our little map of the solar system, in which one inch represents the distance from earth to sun, would have to be extended far beyond the orbit of the moon! On the scale that we have chosen the light year, the distance traveled by light in a year or six trillion miles, the yardstick used in measuring star distances, is about one mile. So on this greatly reduced scale the distances of the stars from the small five-foot solar system expressed in *miles* correspond to the actual distances of the stars from the solar system expressed in *light years*. A motion of four inches in this small scale reproduction of the heavens, which represents the change of position of the sun in a year, very evidently would not have the slightest effect on the apparent positions of the miniature stars miles away. Indeed several thousand times this yearly advance would be inappreciable; and so it is as regards the actual motion of our solar system through space. The heavens appear to us just as they did to the Greeks and the Romans and the Egyptians two thousand years and more ago.

As the sun continues its journeys through the heavens for countless ages, as we have every reason to believe it will, there will come a time, though, when the present forms of the constellations will give way to others and the stars so bright today will fade away and become dim with distance as the sun passes on to other regions and leaves them many light years behind. That is all in the far-distant future, however. Many centuries will pass by before the magnificent Orion, the far-famed Pleiades, or the homely Big Dipper lose their familiar outlines and cease to delight the eyes of future generations of men as they have those of the past.

But let us turn now to the evening sky in October. When the Great Square in Pegasus is seen high in the eastern sky and the Northern Cross in Cygnus has passed to the west of the meridian it is a sure sign that the clear, frosty nights of October are here once more.

Far over in the southeast now appears the brilliant Fomalhaut in the constellation of Piscis Australis, The Southern Fish, which is visible in our latitudes only for a brief period in the fall and early winter. Fomalhaut is one of the twenty brightest stars in the heavens and also a near neighbor of the solar system, its distance from the solar system being about twenty-five light years or one hundred and fifty trillion miles. One will have no difficulty in recognizing this beautiful white star, for it shines in solitary splendor in the southeast far from any other star of the first magnitude in the heavens.

Star gazers this month will find that the constellations of Capricornus, The Sea-goat, and Aquarius, The Water-bearer, two constellations of the zodiac that contain no stars brighter than the third magnitude, have taken the place of the brilliant zodiacal groups of Scorpio and Sagittarius that were conspicuous in the southern sky during the summer months. Scorpio is far over in the southwest at sunset this month. The planet Venus, which has been visible in the western sky after sunset since late in June, passes from Libra through Scorpio this month and will be seen as Evening Star in the southwest for about two hours after sunset. The first of this month the planet Saturn will also be seen for a short time after sunset a little to the northwest of Venus, but before the month is over it will be too close to the sun to be seen in the twilight.

Jupiter is still in the constellation of Sagittarius, directly north of the little inverted milk dipper, and it will be next to Venus, the most brilliant object in view in the southwestern heavens in the early evening. On October 7 Jupiter will be in quadrature with the sun. It will then be ninety degrees east of the sun and on the meridian due south at sunset. Mars, which has now left the evening sky, will next be seen in the east before sunrise, but it is still too close to the sun to be visible. Though it is still on the far side of its orbit from the earth, it has passed the point in its orbit most distant from the earth, and its distance from the earth will decrease from 245,700,000 miles to 238,100,000 miles during the month.

The Big Dipper will be far over in the northwest this month. Though this noted group of stars never sets in the mid-latitudes of the northern hemisphere, it is not in a favorable position to be seen at this time of year when it lies close to the northern horizon. Instead of using the Pointers of the Big Dipper to locate the North Star, it may be more convenient now to make use of the "W" in the constellation of Cassiopeia to find the pole-star and the direction of true north. Cassiopeia lies directly opposite to the Big Dipper with the north pole of the heavens about midway between the two groups, so when the Big Dipper is close to the northern horizon Cassiopeia rides high in the heavens. Cassiopeia lies about halfway between the curved line of three, second-magnitude stars in Andromeda and the North Star. The star Alpha in Andromeda is the farthest west of these three stars and is in the northeastern corner of the Great Square in Pegasus. This Great Square, which is of enormous size, is one of the most distinctive configurations in the heavens and one that every star gazer should know. The star Alpha in Andromeda, the star Beta in Cassiopeia, which is the star farthest west in the

"W," and Polaris the North Star all lie in a straight line with Beta in Cassiopeia halfway between the other two stars. The star farthest east in Andromeda and the star farthest east in the "W" of Cassiopeia also lie in line with the North Star with the star in Cassiopeia, again halfway between the other two stars. A little practice will enable one to find the North Star with the aid of Andromeda and Cassiopeia as readily as with the Big Dipper.

The Milky Way may be traced on clear, dark evenings this month diagonally across the heavens from the northeast to the western horizon, passing from Auriga, now rising in the northeast with its beautiful, yellow, first magnitude star, Capella, through Perseus, Cassiopeia and Cepheus to Cygnus where it divides into two branches, one passing through Aquila in the west and the other to Ophiuchus on the northwestern horizon.

Vega in Lyra, directly west of the Northern Cross, and Altair, in Aquila, which can always be recognized with the aid of the two small stars, one on either side of it, are the only two stars of the first magnitude now visible in the western sky since the brilliant Arcturus has disappeared in the northwest. Above the eastern horizon, however, will soon appear the first of the brilliant winter stars.

"First Aid" to Minnehaha Falls

By T. J. MALONE

TO RENEW the waning vigor of the Falls of Minnehaha, the city of Minneapolis is sinking a well a few hundred feet above its crest. Other wells will be sunk, if necessary, until the water supply is adequate to keep the Falls falling the year round, or during the summer at least.

Much to the disappointment of tourists—to say nothing of that of the home folk—and to a Minneapolis which likes to please its visitors, the Falls in recent years have shown a tendency to dwindle away to a mere trickle in the hot months. While never having gone entirely dry, they have had spells of refusal to gleam and glance, and as for laughter—well their cataractine laughter has been unheard for weeks together.

MINNEHAHA FALLS AT THEIR BEST

The City of Minneapolis is taking steps to save these falls from a fate of dryness.

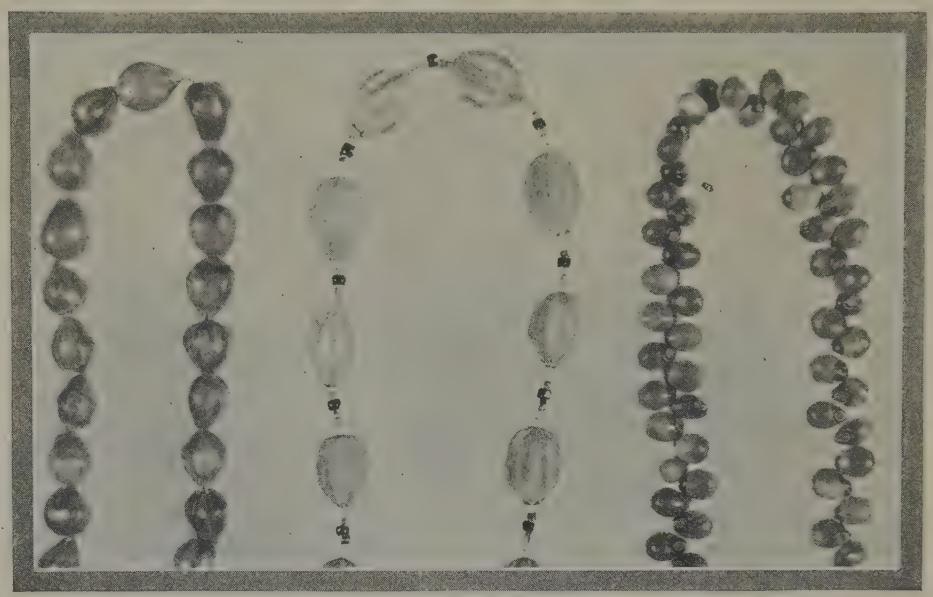
The Falls are a sixty-foot drop in Minnehaha Creek, close to its juncture with the Mississippi River, and the creek is a vagrant stream flowing out of Lake Minnetonka a score of miles west of the city. Cultivation of the drainage basin outside the city and residential settlement of the valley within have been followed by gradual wasting away of the creek waters except in spring and fall. They couldn't stand civilization.

But the Minneapolis Board of Park Commissioners is not going to let the cascade dry up, so long as it can command a drill and a motor. A ten-inch bore is going down, and it is hoped a flowing well will be achieved. If the water refuses to rise high enough to insure an approach to perpetual motion in maintaining the Falls, pumps will be resorted to. Anyhow, the future of the famous waterfall is assured—the summer visitor from Massachusetts or Texas may count with surety on seeing its waters "flash and gleam among the oak-trees, laugh and leap into the valley," as they did when, according to the Longfellow poem, the youthful Hiawatha called at the tent of the ancient Arrow-maker.

Job's Tears and Other Beads

By SALOME COMSTOCK MILLER

IF THE tears which Job shed were as large as the beads which are called Job's tears, the trials which induced them must have been severe indeed. The Job's tear bead is about half an inch long and nearly as wide. It is produced by a rather tall, coarse grass, and is a modification of a leaf sheath into a hard bony structure which contains the seed of the plant. Nature has provided a tiny hole at the apex of the bead, and a very easily penetrable spot at the base, so it is not necessary to drill a hole for the thread to pass through in order to string them. In its growing condition on the plant, the bead has portions of the flower parts hanging out of the hole at the apex. These portions are easily removed when the beads are to be strung, however.



JOB'S TEARS, ROSE BEADS AND CORAL BEANS

Job's tears are not as attractive looking as some other kinds of beads made of seeds. They are not capable of being dyed, but are always found in the natural color, which varies from light to dark gray. One reason for their popularity is the belief that they prevent illness if worn constantly, and that they are especially lucky for children. Perhaps part of the value attributed to them lies in the fact that their hard, smooth surface might afford some relief to a teething baby. The Job's tears grass grows native in tropical countries and is cultivated in gardens in temperate regions. Its common name is apparently taken from its scientific one, *Coix lacryma-jobi.*

Unlike the Job's tears, the coral bean, because of its poisonous properties, could not be recommended as a plaything for children. Coral bean necklaces are looked upon with favor by the grown-ups, however. The bean, with its bright red surface set off by a shiny black "eye," is very striking, and when numbers of them are strung together, with the thread passing through the black portion, forming a necklace with a black center and a red edge, the colors are still more effective.

The coral bean, sometimes called crab's eye, is the seed of a vine, *Abrus precatorius,* which grows in warm climates and in green houses. It belongs to the legume family, the seeds being produced in pods somewhat like those of the ordinary garden bean. In India these little red and black beans are used as measures of weight. Perhaps they are chosen for their attractive coloring, or it may be that they are unusually uniform in size or weight and are preferable for this reason. They are also used in the United States, to some extent, not as a measure of weight but as a medicine. The chief value of the bean, however, seems to be its beauty.

Another rather popular kind of beads is made from the stone of the China tree fruit. This cannot be said to be a seed, for it is an outer bony covering which may contain from one to several seeds. The China tree, *Melia azedarach,* finds much favor as a shade tree in the south, though it cannot endure the cold winters of the north. It is especially beautiful in blossom time, when it is full of lilac flower clusters similar to those of the catalpa. Later a crop of yellow fruits about the size of a small plum appears. The stones of these fruits are the part used for beads. They are cream colored, and rough on the surface. They make very pretty beads in the natural color, but, being easily dyed, they are found on the market in various brilliant and beautiful shades. Other kinds of seeds are sometimes used for beads, but none seem to find as much favor as do Job's tears, the coral bean, and the stone of the China tree fruit. Children sometimes make play-necklaces by stringing the aromatic berries of the wintergreen, which have the advantage, after they have faded, of being good to eat.

Nature Education in an Unnatural Environment

By E. Laurence Palmer

A FRIEND of mine once remarked, "It's all very well for you to expect youngsters who live up there with you in the country to be interested in Nature study, but how can you expect interest from these youngsters who never saw a grove of trees or an animal wilder than a slum cat?"

To find out whether she was right that afternoon I walked up to three of the toughest-looking youngsters I could find playing in a gutter in a congested part of New York City. I proposed that they take a ride with me on the subway to Van Courtlandt Park, and when it developed that I was to finance the expedition into the wilds, the invitation was unanimously accepted.

We descended from the subway (sounds funny, doesn't it?) to a stretch of flooded land and soon sticks and stones began to rain into the water. I discovered some green-frog tadpoles and began to examine them on my own initiative. Apparently my interest was contagious for there was immediately organized upon the spot three separate and competitive biological supply companies which kept me busy looking over material and answering questions. The interest was sustained and of a genuineness superior to that shown by many rural children whom I had subjected to similar treatment. In fact, it was so sustained that I had difficulty in closing shop and getting my charges back to the city where I had an appointment.

This and similar experiences have satisfied me that probably Nature work properly presented holds fully as great an appeal for urban youngsters as it does for those living in a more natural environment.

If Nature work does hold this appeal, shouldn't we take advantage of it, providing we can use it to attain the desired aims of elementary school work. Isn't this particularly so if we can accomplish this with a reasonable amount of effort or with an expenditure of the same amount of effort differently directed. There are individuals who will contend that the value received does not justify the effort expended. There are unquestionably other differences of opinion.

American Nature Association wishes to know the viewpoints on this and on other questions for the benefit of all elementary school children as well as for the benefit of you, the readers of Nature Magazine. These matters concern parents, children, superintendents and supervisors, as well as grade and high school teachers, and all are asked to cooperate in supplying information which will be useful to you. I have over 20,000 returns from rural teachers in New York State. These returns have affected the type of assistance I give those teachers. The results of the questionnaire on this page will in all probability affect the Nature Education Section of Nature Magazine.

If this section can be of more use to you let us know. If you need certain information to overcome opposition to development, let us know what that information is so that we may make an effort to secure it for you.

There has developed in New York City a new means of satisfying the Nature needs of some of its elementary school children. You may enjoy reading the account of Miss Wing concerning these developments and may wish to cooperate or imitate.

The School Nature League

By Helen Wing, *Director*

THE school Nature League is a philanthropic organization which, in a very quiet way, is doing a great service to thousands of public school children in New York City. The ultimate purpose is summed up in the slogan, "A Nature Room in Every School."

The League was founded by Mrs. Alice Rich Northrop, a well-known naturalist and teacher of biology at Hunter College. For many years Mrs. Northrop had been holding flower shows, several times a year, in public schools in different sections of the city. The enthusiasm of pupils and teachers over these exhibits inspired the idea of special Nature rooms in the schools, where fresh material could be placed at frequent intervals and permanent exhibits kept for the instruction and enjoyment of the whole school.

The first Nature room was opened by Mrs. Northrop in the year 1918, in P. S. 62, 25 Norfolk Street, in the heart of the lower East Side district. The room was transformed from an ordinary classroom; its blackboards concealed by fascinating draperies of vines, snake-skins, etc.; and it soon became a community chest of nature treasures. Here Mrs. Northrop and several devoted associates gave informal instruction, after school hours, to the children of the neighborhood. After seven years, many of those same boys and girls, now in the last two years of high school, are still coming regularly to study and to help in the care of the room and the instruction of the smaller visitors.

In this room, which is now the headquarters of the League, any Tuesday or Thursday afternoon may be seen an enthusiastic crowd of youngsters, wandering freely about

the room and enjoying the various exhibits. Some are wearing the button which marks them as junior members of the League, and with them are brothers, sisters, friends to whom they delight to show the living creatures, such as frogs, turtles, snakes, salamanders, tadpoles and goldfish, which are the "permanent residents" of the room. It is very amusing to watch these young naturalists as they teach the names of the shells, minerals, nests, tree and shrub branches, wild and garden flowers, displayed on the tables, to groups of admiring "pupils," and it is evident to the observer that the admiration and respect they receive more than repays the "teachers" for their effort.

The work of the League has been steadily growing. The loss of its founder, three years ago, has not changed its spirit, because Mrs. Northrop's loyal friends have devoted themselves most unselfishly to the work of developing in the children of the great city a love and appreciation of Nature. Each year new rooms have been opened, until now there are twenty-seven in as many different public schools and one in Bellevue Hospital. The best rooms are those where the responsibility for their care is assumed by a teacher or committee of teachers in the school, who devote much time, gratuitously, to the work of keeping the rooms clean and attractive.

Material is furnished and general assistance given regularly by the League's director of Nature rooms. Lesson plans and charts, accompanied by actual specimens, are provided from time to time. During the past year, a classified list of Nature books for teachers and pupils has been placed in every Nature room. Teachers' conferences have also been held in two of the schools, and at each conference the subject matter, mentioned in the New York City Nature Study Syllabus, for that particular grade, has been discussed and suggestions made as to practical and interesting ways of presenting it.

Nature clubs have been organized, and the League cooperates with the teachers in helping to make these club meetings lively and interesting. Junior membership in the League is awarded to children passing a simple Nature test.

A summer camp at Mt. Washington, near Great Barrington, Mass., known as the Northrop Memorial Camp, is sponsored both by the League and by the associate alumnae of Hunter College. Here, during July and August, two different groups of children, boys one year and girls the next, spend four weeks each.

The flower shows, which preceded the establishment of Nature rooms, have always remained an important activity of the League. They are held, at least twice each year, in the playground or assembly hall of one of the public schools.

The League, for the past four years, has also given a demonstration of a typical Nature room at the International Flower Show, held at the Grand Central Palace in March. Much enthusiasm has been aroused in both adults and children by this exhibit, and new members and contributors are gained each year in this way.

The League is very grateful for the financial support and for the contributions of material received from its individual members and friends of members.

We are frequently asked by principals, who have observed the results of our work in other schools, to open new Nature rooms in their schools. As the extent of its possible service is determined by the League's financial status, we are not always prepared to grant these requests. A more generous and regular supply of fresh Nature material is needed to enable us to administer our activities more efficiently and distribute them more widely.

A Suggestion

By E. Laurence Palmer

"SIT DOWN! Sit down! Sit down! You're rocking the boat," is such a common, everyday expression that most of us say it now and then without a thought of what it really means. As a matter of fact there seem to be many more people who say things than there are those who think things. Certainly, with all the unrest there is in the world at present, it is high time that some of us, at least, sit down before the boat tips over and we all have to swim for our lives.

Many of the people who are rocking the boat, which makes life possible for us all, try to convince us that it isn't rocking at all. One group of men, for example, will see a bit of what they call waste land and rush wildly to drain it. To them, that one small piece of land is the only important part of the universe. It is known that a bit of waste land miles from a city made a constant supply of much needed fresh water to that city possible. The men who wished to drain everything, including most other natural resources, were rocking the boat.

A stray bat pursues an insect into a room full of people, and immediately turmoil reigns supreme. Brooms, tennis racquets, umbrellas—all are brandished wildly in the hope that the "vile creature" may be taught his place. The bat, which lives exclusively upon insects, is lucky if he escapes alive to continue his useful occupation of living upon gnats and mosquitoes. In ninety-nine cases out of a hundred incidents of this sort, the chances are that no one will be present to help to keep the boat from rocking.

We kill off skunks because once in a while they eat a chicken or so. Only a comparatively few of us know that skunks grow fat in the fall on grasshoppers and other insects which eat our crops. Skunks rejoice in a meal of turtle eggs, but if the skunks are not left the eggs may grow into turtles which will rejoice in a lunch of the farmer's ducks. When we slaughter the skunk tramp to make a piece of neckwear to adorn a city vamp, we are again rocking the boat, although we may not know it.

We need to be able to appreciate values—values of service rendered by wild life, no matter how obscure it may be, and values of services rendered by ourselves to a community. If some professions get more of the joys of life for inferior service than do other professions which render a superior service, it is all because of the lack of appreciation of values by the everyday public. An adjustment must come about. Someone must call a halt. Someone must show us that the boat is rocking, and rocking violently. Can't we begin by mastering little problems that have a real bearing on life in our home community, By mastering a few things we may become ruler over many. Man has reason. He just doesn't use it always. That's all.

Nature study ought to make us *think,* not *shout.* It should make reasonable human beings out of all who get the point. It may help to keep the boat from tipping over completely. We all know what that means. Let's make balance the keyword this year and see if the idea isn't worth while.

Nature Study Review

Suggestions for the use in Nature Study of the articles in this issue of NATURE MAGAZINE

By Elizabeth K. Peeples

Teacher in Charge of Nature Study, Washington, D. C., Schools

The Airedale Terrier An airedale is "live material" of high order for a nature lesson, and quite within the possibilities for the average class. His disposition and intelligence, his build, and the length of his tail are matters upon which Mr. Terhune's article will throw additional light after the children have made their own observations. From the article they will learn how airedales came into being, the effect of cross breeding, and the very amusing origin of the word "cur." Anecdotes of "Dogs We Have Known" will be legion after reading those given by the author. Such stories are splendid material for oral and written English. The pictures suggest a project for the class in amateur photography. An exhibit of pet dogs and snapshots of dogs would prove popular, and from it much knowledge of dogs in general could be gathered. The files of Nature Magazine will contribute the following help to this general study: "Dogs of the Arctic Frontier," August, 1925; "The Pointer," June, 1925; "Scotty (Scottish Terrier)," April, 1925; "The English Setter," March, 1925; "The Collie," February, 1925.

The words *dog* and *friend* are almost synonyms to those who really know and love the former. Senator Vest's tribute to these faithful followers presents an ideal in friendship which every child should read, and some should memorize.

* * *

The Fish Called Eulachon Here is a story of the spring run of eulachon in the Sandy which is both Nature Study and Literature. It should be read by every Junior High School class studying fish. The numbers of eulachon, which "clutch the fringes of infinitude" are enlightening both as statistics concerning this particular fish, and as an indication of "the fecundity of the sea," which puts human beings "very far from the threat of hunger." But let us not forget that all of a species sometimes congregates in one region, so that to deplete its numbers there means to threaten its existence. The extinct passenger pigeon is a case in point. The "group identity" displayed by the eulachon and paralleled by Monarch Butterflies has other parallels in Nature which should be studied by the class. The most natural comparison is that of the run of other fish, as for example the Pacific salmon. "The Life of the Salmon" in Nature Magazine, December, 1923, should be consulted. Geography teachers will find in this story of the eulachon an attractive point of contact for the study of Oregon rivers, while the adventures of Marco Polo, touched upon in the story, offer still broader incentive to map-making.

* * *

The Life of the Song Sparrow The recognition of bird songs is an inestimable help in locating and recognizing the singers. No effort is too great to train the ears of children for bird music, if they are to become successful bird students. Variations in the songs of a single species, and even a single individual, are much more numerous than generally supposed. Chicken music, though not remarkable for beauty, is easily studied, and expresses many different emotions in as many different forms. After familiarizing themselves with it, children may specialize upon the notes of a common species, like the song sparrow, and gradually add the songs of other birds in the neighborhood.

* * *

The Great Alaskan Brown Bear If the local zoo boasts a "Kodiak Grizzly," a visit to it and the other bears is the ideal way to present the subject. Bears, however, are sufficiently familiar to warrant a lesson in most schools with pictures as material. Having collected and studied bear pictures, the pupils will enjoy trying out their own artistic ability in reproducing in pencil, crayon, or water-color the author's word pictures. Hibernation is discussed in detail in this article. Having considered it in the case of the bear, the class should compare other members of the animal kingdom which hibernate, discovering in each case the cause for the custom, the season, the length of hibernation and the creature's condition before and after.

Ants and the Community Idea Good citizenship, which may be defined as the worthy contribution of the individual to the life of the community, is conceded to be the most important lesson in the education of the young. It cannot be better taught than through the observation of social insects such as ants, bees, and the social wasps. An artificial ant nest is easily made according to directions given in W. M. Wheeler's book on ants, or Comstock's "Handbook of Nature Study." Such a nest properly stocked with earth, ants, a little food, and moisture will furnish material for observation from year to year. Children should be referred to these books and to Nature Magazine for June, 1923, and to Farmers' Bulletins 740 and 759 of the Department of Agriculture.

* * *

The Gulls of Mono "A species of bird is to be regarded much as a race, or at least as a tribe of men might be. . . . In like manner with the birds the temptation is all too prevalent to exalt the characteristics of a given individual to racial rank, or to generalize from the conduct of one particular group. The truth is that a bird species includes an enormous range of individuality; and it is the consideration of individuals, rather than of races, which gives to bird study its keenest zest." The author illustrates this statement strikingly with instances of every grade of domestic felicity and infelicity among the gulls of Mono Lake. He points out also that "the only way one can really understand birds is to live with them, quietly, unobtrusively, reassuringly, day after day." Pupils should read also "The Gull Breadline" in Nature Magazine for June, 1923.

* * *

The School Nature League Teachers and school officials will find in the account of the work done in New York City by a philanthropic organization, "The School Nature League," constructive suggestions for Nature work done in school time under school auspices.

NATURE EDUCATION SURVEY

Those desirous of cooperating in the survey to be conducted by the American Nature Association are asked to fill out this page as completely as interests and experience justify them in doing so. It is hoped that this will bring out some of the points to be considered in the survey. Address the Director of this Department.

DEAR DR. PALMER:

I desire to cooperate with American Nature Association in its attempt to seek information useful in Nature education.

I am giving you the information which my experience has supplied me by crossing off the unnecessary expressions or filling in the blanks in the following outline. I am doing this as a (grade teacher, high school teacher, parent, supervisor, superintendent, interested observer.....). My statements are based on approximately....years of experience having on the average.....(number) children under observation at a time.

There { is / is no } notably better spirit shown by children while doing Nature work than that shown while doing regular school work.

Children show { a / no } greater tendency to ask questions in Nature work than in the common branches.

I find that as an adult Nature work in elementary school work would have been { useful / of little use } to me.

I should have particularly liked to have had as a child Nature work on the following topics.....

Children seem to be more interested in Nature topics that deal with { their immediate environment. / a topic not in their immediate environment but entering into their experience. / a topic entirely outside of their experience. }

If the work is built around the personal experience of the child it seems to be { more / no more } satisfactory.

Nature work carried on in { the regular school room / a special Nature room / the out-of-doors } seems to be most satisfactory.

Children who have had Nature work in the grades seem to be { better / no better } qualified to carry on science work in high school.

Generally those youngsters who are most interested in Nature work are { better / no better } workers than their fellows in other fields.

The best result seems to be secured where the subject matter considered is suggested by { a pupil. / the class. / the teacher. / outside authority. }

It seems most satisfactory generally in Nature work to { consider one Nature topic with a class as a whole / permit groups to work independently / permit individuals to work independently }

If different groups or individuals engage in different types of activity it is { best / unnecessary } that these topics be associated.

If different groups or individuals engage in different types of activity it is best that this grouping be determined by the { teacher. / pupils themselves. }

I consider that Nature trips should have { a / no } regular place in the week's schedule instead of being held during extra time.

I believe that Nature study should be taught generally as { a means of motivating other work. / a separate subject. }

I believe that it is more satisfactory that all grades in a given school study a { given phenomenon / different phenomena } at a given time.

The following Nature books have proven most helpful to children under my supervision.....
.....
.....
.....
.....

The following Nature books seem to me to be most valuable for teachers' use.....
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.....
.....
.....

I { favor / do not favor } Nature work for the following reasons.....
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I should like the following information as to the status of Nature education.
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.....

Very truly yours,

.....

Position.

(Use extra sheet if you desire.)

Reds, Yellows and Greens

By RICHARD W. WESTWOOD

FROM hillside and field, yard and roadside, reds, yellows and greens proclaim the autumn. Nature, dealing in colors, warns of the coming frost, snow and wintry winds. Leaves flutter down—dead browns and saffron yellows. The trees discard their summer lungs to sleep until the warm rains of spring give them life again.

For several months we have enjoyed the cool and restful green shade and color of the trees. Then, as though to remind us of this to which we have given, perhaps, only passing thought, Nature paints the leaves in vivid tones. They attract us, and it is as though Nature said, "Behold the beauty of these leaves you have had these months. They are dying now, but others will return."

In this autumnal color pageant most of our hardwood trees play a part, some more strikingly than others. Maples, elms, gums and oaks contribute their brilliant reds and yellows against backgrounds of slower changing branches or the year-through greenness of the softwoods. The sap has ceased to course through the trunks and branches. The trees have stopped breathing through the leaves. The vital green fades out, leaving the red or yellow pigment of the leaves. The stems loosen at the twigs, and, freed, the foliage drops down to enrich the earth.

One of the first trees to warn us of the approach of winter is the red maple of the eastern states. The light green of its small leaves turn to reds and yellows, some with red outstanding, others with yellow. The smaller branches and limbs often bear autumn leaves in August, making striking symphony with the leaves still green. The poplars are also early chroniclers of fall, their leaves turning yellow early, but dropping quickly.

The sugar maple, with its larger leaves of richer green, the native maple of our northern states and the mountains extending to the south, puts on a yellow garment for autumn. Its yellow is not as brilliant as that of the leaves of the Norway maple, but the foliage of this member of the maple family drops from the limb soon after the green has left.

The red oak, found throughout the eastern half of our country, turns later than most of its hardwood neighbors. From a deep green the leaves become a rich red of striking beauty against a yellow background. Even more striking, however, are the autumn colors of the scarlet oak. The foliage and limbs of this tree are more broken, and the brilliant leaves stand out like a tree decked out with poppies. Another beautiful member of the oak family in the fall is the pin oak, with its low-sweeping branches shedding scarlet leaves to the ground.

Starting early in its transformation from foliage of dark green, the tupelo or sour gum adds brilliant red to the woods of southern New England and the northern states. It is found, as well, in most of the eastern half of the United States in the regions of the Appalachians and the Mississippi Valley, where another gum, the sweet gum, boasts autumnal beauty. This tree heralds the waning year with leaves that appear bright scarlet at a distance, but are found to be touched with yellow when one pauses nearby to admire.

Bright yellow stains the leaves of the members of the hickory family in their fall dress. The tulip tree, or yellow poplar, takes on a yellow, also, but one of lesser brilliance. This tree, a native of Indiana, Pennsylvania and Ohio, as well as the south, loses its leaves early. Another tree which does not play a long part in the autumn pageant is the American elm. A part at a time, it turns yellow, but the passing leaves drop quickly.

An oriental contributor of glorious fall colors is the ginkgo. The bright yellow of the more delicate and feathery leaves of this tree, which thrives wherever there is plenty of water, is of outstanding beauty.

Among the smaller trees that splash the autumn landscape with alluring colors is the crape-myrtle. The summer's end brings a bronze or a rich red to its leaves. Giving us its beautiful white flowers in the spring, the flowering dogwood presents us with bright-red leaves in the fall, while even later its scarlet berries are like drops of blood against the early snow.

There are many bushes which never attain to the dignity of even small trees, but which transform the autumn fields and hillsides into riotous and glowing colors. How many of us have exclaimed at the gorgeous reds of the staghorn and dwarf sumacs and at the delicately beautiful greens, reds and yellows of the climbing ivy?

Although for the most part less striking, there are many other shrubs and plants that signal their outgoing with colorings of Nature's reds, yellows and greens. They flash their gorgeous autumnal trappings for a day or week. Then Nature puts away her paints and goes to mixing greens of varied hues for the next spring's painting of tree and shrub.

NATURE NEWS AND VIEWS

Ladybird Beetles

Indian Canyon is the winter haunt of many wild creatures, writes Enid Michael, of the Yosemite National Park Nature Guide Service. One of the least in size of the winter denizens of the warm canyon, as well as one of the most numerous, is the ladybird beetle, *Hippodamia convergens*. Late in the year millions of these spotted, red beetles creep under the ground cover of pine needles and go to sleep. They do not sleep alone, but a pile of a thousand or more couch together. When the sun comes out warm in winter, as it frequently does, the snow soon disappears from Indian Canyon. Then the Ladybird beetles awake and come out into the delightful sunshine for a little exercise. Crawling this way and that over the interlacing needles, they often collect into social groups or a couple here or a couple there make love. The chill of evening drives them in, and during storms they may sleep for weeks.

With a Nature Guide

"Early spring flowers were in bloom along the Ledge trail," writes Enid Michael of the Yosemite National Park about a trip to Sentinel Dome at Glacier Point with a Nature guided class. "Tall, airy sprays of alum-root (*Heuchera micrantha*), delicate clustering bells of draperia and lemon-yellow flowers of Yosemite sedum grew on the dry lower slopes. Then there was the startling golden hawkweed (*Crepis acuminata*) and the rose-magenta, pride of the mountains (*Pentstemon menziesii*). Where the trail turns into the shaded chimney and climbs to the music of dancing streams, water loving plants were found. These, for the most part, were not yet flowering, but there was one member of the buttercup family, *Actaea spicata arguta* with towsley heads of white bloom, and an exquisite saxifrage whose delicate sprays of white flowers rose from clusters of round, toothed leaves."

For Map Lovers

There are many who have a passion for maps, and these will be gladdened by the latest map published by the United States Geological Survey. This map is of the Attean quadrangle, covering about 200 square miles just south and east of the Canadian border in Maine. It is a map of a country abounding in lakes and streams, a mecca for the camper, canoeist and outdoor lover. The topography shown is in the greatest detail, the many beautiful features of this country being noted faithfully. It is printed in five colors as a part of the great topographic map of the United States that is being made. The expense of the surveys was some $8,000 but the map is available from the United States Geological Survey in Washington at ten cents a copy and six cents wholesale. A similar map of the Belmont quadrangle in New York near the Pennsylvania line is available on the same terms.

Membership Nomination Blank

American Nature Association Washington, D. C.

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....., 1925

Secretary, American Nature Association,
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"NO, I don't read many good books. After a hard day's work at the office I don't feel much inclined for heavy reading."

The man who was talking had expressed surprise at his host's extensive library, where they were sitting over their cigars.

"If you once got started, I don't think you'd find good literature 'heavy,'" the host replied. "After all, the only reason why our greatest authors are considered great is because they can tell a story better than anyone else. The trouble is that most people make hard work of reading. They get hold of the works of some famous writer and plough through them with a grim determination to do or die.

"The whole secret is to get variety into your reading. Spend a few minutes with one author today, with another tomorrow. That's the way I do, and I wouldn't miss my daily dip into a good book for anything. And, incidentally, I don't feel tongue-tied when people start to talk literature."

* * *

How many times have *you* resolved to read the world's great masterpieces—and been baffled by the problem of what to read and where to begin? You know that good reading offers the surest, quickest way to broad culture, that it enriches your personality, stimulates your mind, increases your powers of expression, makes you more interesting to others.

But there is such a vast store of literature. We have only time for the most outstanding masterpieces. Where shall we begin? How can we avoid monotony? How can we get daily variety?

What is this new idea?

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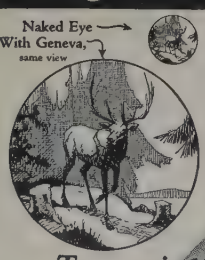

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A Wise Bird

"I scattered some hard bread crusts on the ground near my bird fountain," writes Franklin Feriss of St. Louis. "A black bird, I think a grackle, picked up a crust the size of a pigeon's egg and after trying in vain to crush it, flew with it to the fountain, dipped it in the water two or three times and swallowed it. Does this not indicate reason? It might be natural and instinctive with a waterfowl but I should think not with a grackle." We are inclined to agree that it was a wise bird.

The Favorite Rose

Although more than two thousand varieties of roses have been developed, flower scientists have not yet stopped and are now experimenting on new varieties, according to Dr. Marshall A. Howe, assistant director of the New York Botanic Garden. The popularity of this flower is unchecked and a test of popularity was recently made by the American Rose Society. A poll was taken revealing that the rose named the Dr. W. Van Fleet is the most popular among the hardy climbers while Radiance and Ophelia share honors in the field of hybrid tea roses.

Diseases of Grouse

That ruffed grouse in the wild suffer frequently from tuberculosis, pulmonary mycosis and another as yet unidentified disease has been established by Dr. Alfred O. Gross of the Roosevelt Wild Life Station of the New York State College of Forestry at Syracuse. A careful investigation has been made of the causes of natural demise among these birds, developing these results and accounting in some measure for the fluctuation in the numbers. Dr. Gross urges that all naturally dead grouse be preserved in order that further study may be made to insure perpetuation of the species.

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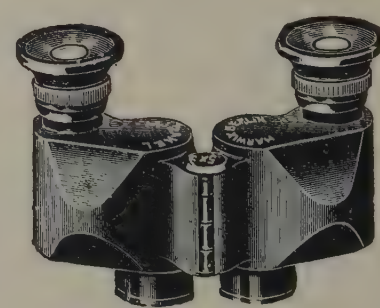

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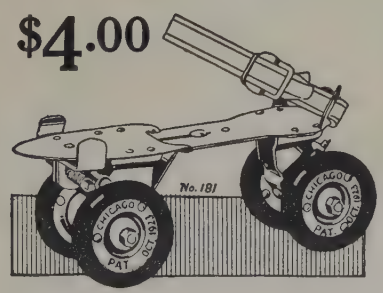

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Rattlesnake Diet

H. C. Bryant of the Yosemite Nature Guide Service tells the following story in the Yosemite Nature Notes:

"Although it is generally known that rattlesnakes feed on rodents, it is not often that one is afforded a chance to see what may be considered a worthwhile meal by this snake. A report that a rattler had been killed with some large mass of food in the stomach was followed up and a dissection made with the result that still greater respect is had for the snake's ability to consume sizable mammals. The rattlesnake was little more than two feet long, although it possessed nine rattles. In diameter of body it was about one inch, except where distention showed a large mammal had formed a recent meal. From the stomach was taken a large wood rat fully two and a half inches in diameter and nine inches in body length, exclusive of tail. A look at the head and constricted neck of the snake made one wonder how so large an animal could have been swallowed. Only to one who has seen a snake distend the bones of the jaws and head in enveloping its prey does a feat like this seem possible. The firmly knitted jaws of a mammal would not allow of swallowing a mass of food larger around than the size of mouth and neck. Part of the flesh of the rat's head had been digested away, but otherwise the mammal was intact."

Honeybee in Flight

How busy is the busy bee? Its detailed study had ever been made to answer fully this question until the Bee Culture Laboratory of the United States Bureau of Entomology set about to find out the activities of the honeybee in flying to and from the hives. The results are published in a Department of Agriculture bulletin by A. E. Lundie. It includes graphs and statistics that tell just how busy the bee is, as well as other information on his activities.

A Hornet at Work

"A hornet has started a nest on our kitchen window glass, outside, and is constructing it with the side open facing the room," writes Charles L. Batchelor of Baltimore," so that every operation is visible. It is about the size now of a large lemon. She has built her cells, laid and hatched her young—at least her young are still in the cells, but are lively a good bit of the time. This nest is located in the middle of the window on an angle with our eyes and it promises to be an unusual treat."

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Forest Fire Outposts

Like the sappers of trench warfare, emergency forest fire crews have been given outposts of responsibility in the battle against the red demon in the Pacific Northwest this year, according to C. M. Granger, district forester of the U. S. Forest Service. Each crew or squadron consists of one forest fire chief, two or three fire foremen, one camp superintendent and one cook. They are located at strategic points in the forest fire regions, and direct only the work on large fires. Each squadron is supplied with motor transport for a quick getaway and is in telephone communication with the forest supervisor's headquarters. During the time they are not actually needed on forest fires, they work on road and bridge building and other forest improvements.

A New Salamander

Nature guides in the Yosemite National Park recently experienced quite a thrill of excitement when the park naturalist brought to light a salamander new to the park and apparently new to science. The first specimen found was very young and immature. A satisfactory diagnosis of the species is difficult to make from this undeveloped individual and the nature guide staff has been scouring the region about Fern Spring in an attempt to locate an adult of the species.

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Mr. Cody has specialized in English for the past twenty years. But instead of going along in the old way he has applied scientific principles to teaching the correct use of our language. He made tens of thousands of tests of his various devices before inventing his present method. In all his tests he found that the trouble with old methods is that points learned do not stick in the mind. In school you were asked to remember rules, and if you forgot the rules you never could tell what was right and what was wrong. For years Mr. Cody has studied the problem of creating instinctive habits of using good English. As a result of his experience he evolved his wonderful new

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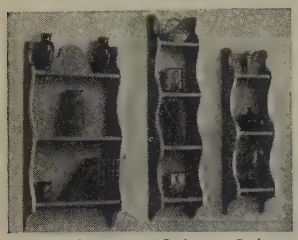

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Yellowstone Flowers

"Owing to constant rain the wild flowers are unusually brilliant and abundant this year all over the park," writes Professor H. S. Conard, Nature guide, in the Nature Notes of Yellowstone National Park, "about Mammoth golden yellow groundsels and dwarf asters color the ground along roadsides and make great sheets of gold over the hillsides. About the hot springs and geysers the deep blue fringed gentians are in their prime. They open wide only in bright sunshine. Over the Continental Divide the creamy buttercup-like globe-flower stands in long strips by shaded brooks, and the deep yellow adders-tongue or dog-tooth violet is beginning to fade. Lupines were never more brilliant or abundant. Their blue spikes, clustered on every grassy hillside, color many acres at a time. On Specimen Ridge there are millions of them. Red wild geraniums dot the hills and meadows, and white ones grow along the brooks. All the sunny hillsides bear clusters of balsam root—big yellow sun-flower-like heads, from a cluster of big dock-like leaves. About Dunraven Pass our gorgeous yellow and pink columbine is at its best. The flanks of Mt. Washburn are sweet with the scent of cushions of white phlox and clusters of loco; white, blue, purple and red. Indian paint-brushes are in view, especially the cerise-colored one that grows in cold hillside marshes and at the edge of the snow. The roadside over Crescent mountain is blue with Jacob's ladder and giant aster. Every high hill pasture is dotted with blue forget-me-nots and the tall, branched false forget-me-not or stickseed. Almost everywhere the great yellow daisy-like arnicas are seen. Flowers, flowers everywhere, but not one too many. Let's not pick one, but leave them all for the other hundred thousand tourists to see and enjoy."

Blame the Minority

The necessity of drastic laws and strict enforcement is usually, if not always, because of the lawless minority. Four hundred thousand acres of National Forest lands in Oregon and Washington had to be closed against recreational uses this summer on account of fire hazard. The bulk of citizens who are careful with their campfires, their casually lit match and burning cigar or pipe "heel" had to vacation elsewhere because there remain a minority of thoughtless and don't care fellow citizens. Even with our common property in the National Forests we find among us some whom we could well do without.

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Ideal Cardinal Family

Publication in this department in April of observation of cardinals, the male member of which family was not as attentive as might be, has aroused considerable interest. Mrs. C. W. Ailor of Parkersburg, West Virginia, rallies to the side of the conjugal felicity in the cardinal family. She writes:

"We have had a pair for five years, and as I am a "shut-in" I have observed them closely. In the summer the bird table is in a small tree by the front porch, during the winter months on our front porch in full view of the living room window. All winter long the male cardinal feeds his mate —perhaps every half hour—rice, corn, peanuts, always helping her first. Often she alights on a peach tree limb, and he comes in, gets a mouthful and goes to a branch perhaps a foot from the branch she is on and reaches across to feed her, coming back for many mouthfuls for her. When they were in the nest, the pair were at the table together every few moments, but when the young were old enough to fly up in a large oak she wouldn't permit her mate to come on the table, hissing and fluttering her wings and believe me he always stood back at a respectful distance until she had flown with her mouthful then he hopped in and got his portion for the young. But now the young come along and she is very agreeable often giving him a grain of rice. Last year a cat pulled her tail feathers out and she felt so miserable he cuddled up close to her and would kiss her on the beak repeatedly."

Interfering Again

If there is any one habit to which mankind seems chronically addicted it is interference with Nature's scheme of things. According to an item in the Fredericksburg, Virginia, newspaper, called to our attention by G. W. Rawson of Detroit, the citizens of Madison and Page Counties of Virginia are planning "Snake Day." This day will be dedicated to a concerted reptilian killing. Knowingly, the news item suggests that an increase in reptiles has come about as a result of a drive against hawks "as the hawk kills them, being as fond of snake meat as it is of chicken." Apparently the several species of hawks who disdain chickens as a diet and perform Nature's work otherwise are not recognized in this vicinity or were killed off in the drive against the two or three predatory hawks.

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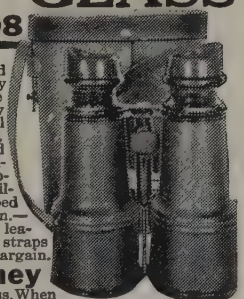

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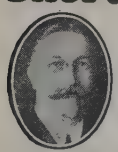

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Insure Great Oaks

Word comes from a member that four majestic oak trees flanking St. Louis's two outdoor theaters are to be insured for a total of $60,000 against loss by storm, lightning and other causes. Steps have been taken by the Municipal Opera Association to take out $5,000 policies with Lloyd's for each of the two seventy-foot oaks, which form a natural proscenium in the Municipal Theater, while the owners of the new Garden Theater have asked for $25,000 insurance for each of the two trees flanking that theater.

Profits of Conservation

Establishment of Indiana's Department of Conservation has increased the State's receipts by $101,000, and has resulted in a marked increase in game, notably in the numbers of quail. More than 10,000 acres in Brown County is being purchased for propagation of game, and if the receipts of the Fish and Game Division permit, Indiana hopes to boast a public shooting grounds soon.

In One Garden

Long trustee of Pennsylvania State College and a much beloved citizen of Howard, John A. Woodward finds one of his greatest joys in tending the garden. And why not when one considers the friends one makes there. To wit: A pair of robins homesteaded in a pear tree. Four tiny eggs were soon being cared for by the bright-eyed little mother. The "man who tends the garden" set out to make friends. He succeeded, winning such confidence from the mother bird that she would take bits of bread from his hand and objected not at all to an affectionate scratch on her head or pat on her bill.

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Questions and Answers

The American Nature Association will be glad to answer each month such questions as its members ask about Nature.

QUESTION: *Can you tell me where and when such fresh water fish as carp, cat and bass lay their eggs?*—T. C. F.

ANSWER: The carp, a fish imported many years ago from Europe, lays its eggs in summer in small masses which adhere to stones, twigs or the stems of various water plants. The eggs hatch in from 12 to 16 days. The orange-colored eggs of the common catfish are laid in spring in a sort of nest prepared by the parent. The female guards them until they hatch, and then leads the school of black young ones about the stream, protecting them and helping them to find food until they can take care of themselves. The bass lays its eggs in spring and early summer on gravel bars where the parent makes a nest by scooping a hollow in the gravel. The female guards the eggs from the attack of enemies while they are hatching, which takes from 7 to 14 days.

QUESTION: *Will you kindly tell me what kind of a turtle the one described as follows is and how to keep and feed him: The length of the shell is 6 inches and width 5½ inches. The turtle weighs 1½ pounds. The shell is dark brown and smooth with large markings on top. The underside is yellow, while the under side of the upper shell is marked with red. The tail is short and pointed and marked red and yellow, while the claws are marked with red. The head is marked with yellow marks back of the eyes?*—G. S. H. Jr.

ANSWER: Your pet is the painted turtle (*Chrysemys picta*), a rather common species east of the Alleghanies. It is close to the maximum size and so must be many years old, but we cannot say how many. They do not lay eggs, however, until about fourteen years old, and yet most of the mature ones are considerably smaller than yours. The species sticks rather closely to water, so you should keep it where it can have plenty. The food taken by it in Nature consists of a great variety of vegetable substances, mostly water plants and many insects, especially the larvae of dragonflies and other insects that breed in the water. You will need to experiment with various foods. Try grasshoppers, fruit, berries and anything you can find. As it gets tamer it may eat more readily. You need not fear that it will die for lack of food for some time, although turtles usually eat freely during the summer.

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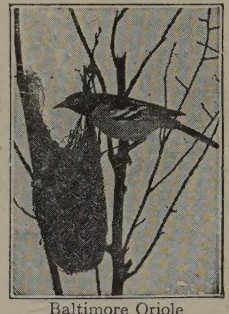

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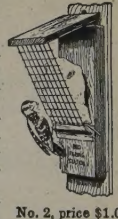

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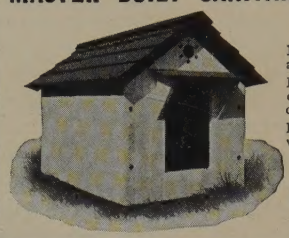

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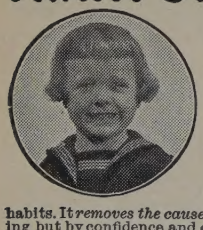

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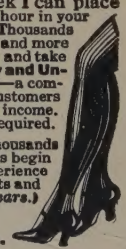

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THE TREE PLANTING ARMY

Road of Remembrance to Be Planted in Honor of James Whitcomb Riley

A tree dedicated to the children of the Sunshine Dominion School of Virginia, Ill., is registered on the Honor Roll of the Tree Planting Army by Mrs. Henry Jacobs.

* * *

Pupils of the Public School of Cold Brook, N. Y., under the direction of Randall B. Silliman, the principal, have joined the Tree Planting Army.

* * *

The committee of the St. Joseph County Federation of Women's Clubs, through Mrs. Charles Neuman, is pushing tree planting throughout that Michigan county.

* * *

In a tree planting campaign at Hamburg, N. Y., a quantity of educational material from the Association, including the application blank, is being used for posters in the various shops of the community, C. F. Bley reports to Charles Lathrop Pack.

* * *

A state wide campaign to cover a period of years has been started by *Holland's Magazine* at Dallas, Texas, in cooperation with the American Tree Association. The campaign will be conducted through the public schools and as a result there will be large registration in the Tree Planting Army.

* * *

Tree planters are to get the message in *Town Forests* published by the Association in the Pittsburgh district now that the material of the American Tree Association is being used in a general science course in the high school at East Brady. Robert B. Nixon is using the booklet in his courses.

Through the Nature Study Department of the Pittsburgh Public Schools, John A. Hollinger, the Director, put on a big tree planting program.

The Nature Study Club of the high school in Delta, Colo., has joined the Tree Planting Army in a body.

* * *

The Ogontz School in Pennsylvania has enlisted in the Tree Planting Army and registered the planting with the American Tree Association.

* * *

Marking Founders Day at Berea College, Ky., classes of the Normal School and the Senior High School, as well as the Ninth Grade, have planted trees and registered them with the American Tree Association.

* * *

Local leaders of the Girl's Reserve of the Young Women's Christian Association are taking up the tree planting campaign this fall. The work will be conducted through the local secretaries following arrangements made with the New York Headquarters. From Fort Wayne, Indiana, comes a report of a community Christmas tree planting by the Y. W. C. A. there. The registration is made by Eudora Ratcliffe.

* * *

In order that the people of the United States may pay honor to James Whitcomb Riley, the James Whitcomb Riley Memorial Hiway Association, cooperating with the American Tree Association, has started a campaign for tree planting along the James Whitcomb Riley Memorial Hiway. The Headquarters of the Association are at Anderson, Indiana, and the tree planters are to have a special application blank for membership in the Tree Planting Army. Plans are now being mapped out for the tree planting along this route from Michigan to Florida. It is exepected that the people of Indiana will, of course, lead in this work.

Tree planters are reporting to the Tree Planting Army through the Pittsfield, Mass., Chapter of the Agassiz Association.

* * *

The Illin Camp Fire under the direction of Mrs. G. L. Dally, of Stockton, Ill., is taking up tree planting and registering the tree planters in the Tree Planting Army.

* * *

On the grounds of the University Settlement, Milwaukee, a memorial tree called "the Sterns Tree" has been planted by the Women's Club.

* * *

L. J. Stearns, the principal of the Wallace Foster School, Indianapolis, reports the planting of five "hero trees" on the grounds of the school.

* * *

Another Christmas tree to be registered to the Tree Planting Army is the one planted by the pupils of the Garfield Home and School League of Niles, Ohio. Their registration is made by Louise M. Lloyd and Mrs. Edna M. Miller.

* * *

The Waucoma Chapter of the Daughters of the American Revolution is one of the latest chapters of that organization in Iowa to join the Tree Planting Army. The planting on a memorial road is reported to the Association by Miss Ethel Weyman and Mrs. Maud Adams.

* * *

The only way to join The American Tree Association is to plant a tree and register it with the Association, 1214 Sixteenth Street N.W., Washington, D. C. The Association will send tree-planting suggestions and a tree-day program for two cents to pay postage.

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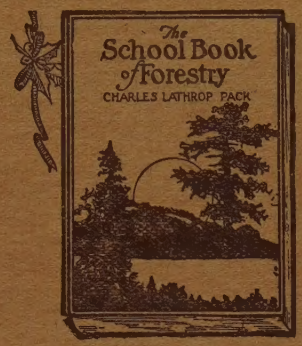

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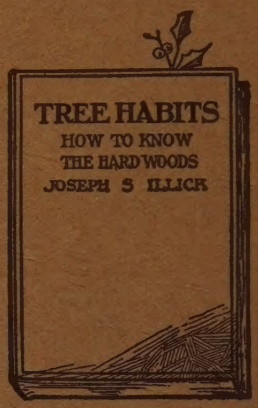

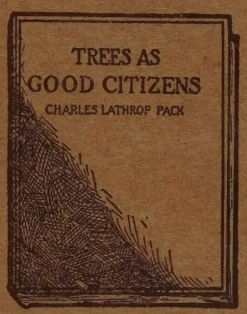

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